American Machinist

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# Shop Equipment Review

**Semi-Annual Résumé of machinery, tools, mechanisms, parts, and materials described in the Shop Equipment News sections of the American Machinist during the last six months of 1929, and also a similar résumé of the Engineering Workshop Equipment sections of the European Edition for June to November, 1929, inclusive**

DURING the last six months, more metal-working machines and related equipment were placed on the American market than in any similar period. Roughly, the increase was about one-fifth. Of course, the National Machine Tool Builders Exposition brought out a large share of the 431 items reviewed.

To date, tungsten carbide has not caused radical changes in machine tools, but it has brought about general refinements such as much greater rigidity, increased spindle speeds, and extended use of anti-friction bearings, and heat-treated alloy steels for spindles, gears, and clutch parts. There have been offered, however, at least six machines designed especially for the use of this material. They include three hydraulic chucking machines and three lathes. Two types of lathe tools employing inserted tungsten-carbide tips have been marketed, with claims of higher permissible feeds at high speeds without chatter.

The use of hydraulic feeds on machine tools has received a decided impetus during the last six months. Twenty-one such developments are listed. Ten grinding machines are affected. Other applications are: one boring machine, three drilling machines, one chucking machine, one lathe, two milling machines, one gear rougher, a shaper-planer, and a molding press.

Grinding machines are still in the forefront in point of number developed, 49 being offered during the period under review, whereas only 32 were marketed in the first half-year. Tool grinders constitute the largest class, but all types are well represented.

Chucking machines show considerable development. Hydraulic operation is embodied in one type, and spindle speeds up to 2,200 r.p.m. are used. Boring machines are heavier, with precision and flexibility as features.

More drilling machines have been developed during the past semi-annual period than ever before. All types are met with in the 35 offerings, but of especial interest is the development of high-production machines. One such machine has twelve spindles.

Outstanding among the gear cutters is a bevel gear rougher equipped with a magazine feed at each of the four stations and having complete hydraulic operation.

Lathes have also undergone considerable refinement. Three models are speeded for tungsten carbide, and one has all controls operated hydraulically and automatically. An exceptionally large turret lathe has been built, capable of taking 10-in. bars with a maximum turning length of 62 inches.

Automatic hydraulic operation has been applied to one milling machine, and all types show continued development in sturdiness and the use of better materials. Greater power and strength than usual are embodied in a shaper-planer having hydraulic operation of both the table and the feeds.

Steel frames and semi-steel castings continue to find application in presses. A machine for punching flanges and webs of heavy structural shapes, and shears for bars, billets, plate, and the squaring of sheets are offered. Five new designs in furnaces are shown, one being a conveyor type and another a pit type for heat-treating aluminum alloys. Finishing is receiving more attention, as indicated by five items.

V-belt drive has found most favor on the polishing machines, but one type has herringbone gears interposed between the motor and the detachable spindles. The usual number of welders have appeared, but the most significant development is that of welding rods for a wide variety of purposes. Wood-working equipment is well represented.

Parts and mechanisms have received more attention than usual, five ball and roller bearings, two hydraulic controls, and two pumps being described. Irons and steels introduced are for a wide diversity of purposes.

English and German makers are largely responsible for the 104 items of the European section. Production machines are very few, but a drilling machine with three tables for repetitive work and a hydraulic plunge-cut grinder are examples of an awakening interest in this class of machine for European applications.

# CONTENTS OF THE REVIEW PAGES

## American Edition


| | No. | Page |
|---|---|---|
| **Boring and Turning Machines** | **1-15** | **79** |
| Horizontal | 1-3 | 79 |
| Jig | 4-7 | 79 |
| Special-purpose | 8-10 | 80 |
| Chucking and screw machines | 11-15 | 80 |
| **Drilling Machines** | **16-53** | **81** |
| Upright | 16-26 | 81 |
| Sensitive | 27-30 | 84 |
| Radial | 31-35 | 84 |
| Horizontal | 36-37 | 85 |
| Special-purpose | 38-43 | 86 |
| High-production | 44-45 | 87 |
| Portable | 46-51 | 87 |
| Attachments | 52-53 | 88 |
| **Gear Cutting and Testing Machines** | **54-66** | **88** |
| Bevel generators | 54-56 | 88 |
| Hobbers | 57-60 | 89 |
| Shaper | 61 | 90 |
| Miscellaneous | 62-66 | 90 |
| **Grinding Machines** | **67-123** | **91** |
| Cylindrical | 67-70 | 91 |
| Face | 71 | 91 |
| Internal | 72-75 | 91 |
| Surface | 76-80 | 92 |
| Special-purpose | 81-87 | 93 |
| Tool | 88-99 | 94 |
| Lapping | 100-101 | 96 |
| Floorstand | 102-113 | 96 |
| Portable | 114-116 | 98 |
| Attachments | 117-123 | 98 |
| **Lathes** | **124-150** | **99** |
| Automatic | 124 | 99 |
| Engine | 125-131 | 99 |
| Turret | 132-135 | 101 |
| Toolroom | 136 | 101 |
| Special-purpose | 137-139 | 102 |
| Attachments | 140-150 | 102 |
| **Milling Machines** | **151-163** | **103** |
| Horizontal | 151-155 | 103 |
| Vertical | 156 | 104 |
| Planer-type | 157 | 105 |
| Universal | 158-159 | 105 |
| Miscellaneous | 160-163 | 105 |
| **Planers and Shapers** | **164-173** | **106** |
| Shapers | 164-167 | 106 |
| Attachments | 168-173 | 107 |
| **Presses** | **174-195** | **108** |
| **Punching and Shearing Machines** | **188-195** | **110** |
| **Threading Machines** | **196-204** | **111** |
| Tapping and threading | 196-200 | 112 |
| Pipe threading ttachments | 201 202-204 | 112 112 |
| **Welding Machines** | **205-209** | **113** |
| **Other Machines** | **210-253** | **114** |
| Bandsaws, metal | 210-211 | 114 |
| Broaching | 212-214 | 114 |
| Core making | 215-216 | 114 |
| Flue rolling and cutting | 217-218 | 115 |
| Marking | 219-220 | 115 |
| Sawing | 221-226 | 115 |
| Riveting | 227-230 | 116 |
| Nut and screw-driving | 231-233 | 117 |
| Miscellaneous | 234-253 | 118 |
| **Balancing, Gaging, and Testing Equipment** | **254-266** | **121** |
| Balancing | 254-255 | 121 |
| Testing (general) | 256-259 | 121 |
| Gaging | 260-266 | 122 |
| **Electrical Equipment** | **267-287** | **122** |
| Motors | 267-271 | 122 |
| Control devices | 272-286 | 123 |
| Miscellaneous | 287 | 125 |
| **Furnaces and Equipment** | **288-297** | **125** |
| **Material Handling Equipment** | **298-302** | **126** |
| **Painting Equipment** | **303-307** | **127** |
| **Polishing Equipment** | **308-315** | **128** |
| **Transmission Equipment** | **316-322** | **129** |
| **Welding Equipment** | **323-344** | **130** |
| Welders | 323-328 | 130 |
| Welding rod | 329-337 | 130 |
| Miscellaneous | 338-344 | 131 |
| **Woodworking Equipment** | **345-355** | **132** |
| Boring machines | 345-346 | 132 |
| Bandsaws | 347-348 | 132 |
| Saw benches | 349-350 | 133 |
| Saws, hand | 351-353 | 133 |
| Miscellaneous | 354-355 | 134 |
| **Small Tools** | **356-384** | **134** |
| Cutters | 356-359 | 134 |
| Nut and stud setters | 360-361 | 134 |
| Reamers | 362-365 | 135 |
| Saw blades | 366-367 | 135 |
| Toolbits and lathe tools | 368-370 | 135 |
| Tungsten-carbide metal | 371-372 | 136 |
| Vises | 373-374 | 136 |
| Miscellaneous | 375-384 | 136 |
| **Parts and Mechanisms** | **385-395** | **137** |
| **Irons, Steels, and Alloys** | **396-408** | **139** |
| **Miscellaneous Equipment and Supplies** | **409-431** | **140** |

# *Boring and Turning Machines*

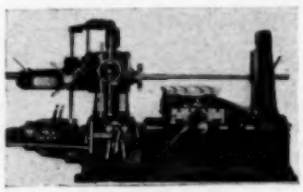
— 1 —

## Boring Machine, Horizontal, Model 41, 3-Inch Spindle

*Lucas Machine Tool Co., Cleveland, Ohio.* [Vol.71,p.478]

This machine, as compared to the No. 31 which it supersedes, is heavier, has a wider bed with leveling screws, a longer saddle, 50 per cent more speed changes, automatic lubrication, and other improvements.

The saddle is provided with automatic equalizing clamps operated from the front. There



are also means of clamping the table and spindle head. Automatic lubrication is provided by means of a pump in the driving-gear box and by oil rings on the spindle. A type of square swiveling table, made in 26-in. and 37-in. sizes, is designed to afford greater clamping surface and better support of work at the edges. The square table is mounted on a baseplate. It is graduated in half-degrees. Swiveling is facilitated by an elevating ball-thrust bearing.

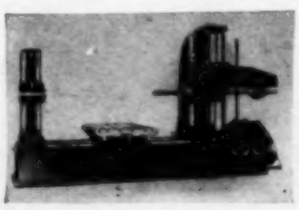
A special indexing device has a pair of dial indicators graduated in half-thousandths of an inch and carried in holders adjustable along strips on the column and at the side of the table. Suitable troughs are provided to hold standard ½-in. rounded measuring rods, special length-gages, inside micrometers, or the like, between the indicators and fixed abutments on the top of the head and side of the saddle casting.

— 2 —

## Boring Machine, Horizontal, Tri-Way, No. 40

*Universal Boring Machine Co., Hudson, Mass.* [Vol.71, p.507]

This machine has a 4-in. spindle in a 6-in. quill running in Timken bearings. The spindle has a 30-in. travel without re-



setting, and has a total travel of 60 in. All spindle-driving shafts and gears are of heat-treated, chrome-nickel steel mounted on ball and roller bearings, as is also the six-splined vertical drive shaft. The driving gear in the head is mounted on ball bearings independent of the shaft. A pump supplies lubrication to all bearings.

Spindle speeds vary from 8 to 300 r.p.m. All spindle driving gears, whether fixed or sliding, are mounted on six-splined shafts. The feeds for milling are from 0.53 to 11 in. per min., and for boring, from 0.13 in. to 2.75 inches.

The machine has a table 40x 64 in., with a cross feed of 48 in. The maximum distance between the faceplate and the outer support is 96 in., and the maximum height from the table to the spindle is 32½ in. A motor with chain drive is standard.

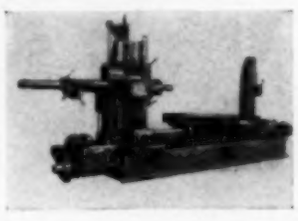
— 3 —

## Boring Machine, Horizontal

*Hill Clutch Machine & Foundry Co., 6400 Breakwater Ave., Cleveland, Ohio.* [Vol. 71,p.1061]

Two sizes of this horizontal boring mill, which have 3- and 4-in. boring bars, respectively, have been developed. The machine is of the precision type and will perform boring, milling, and tapping operations. It can be furnished with any length of bed, height of column, and outer support, and with larger than standard tables, if desired.

The bed is of cabinet form. Adjustable taper bearings sup-



port the spindle, which can be adjusted to 0.001 in. Verniers can be furnished for the table cross feed. All shafting used is made from special alloy steel, heat-treated and ground.

All feeds are engaged by a positive clutch. Shear pins protect the entire feed mechanism. The machine can be reversed so that left-hand millers and cutters can be used. Convenient control is obtained by means of a start and stop mechanism, of which both levers are adjustable and slide along the horizontal bars to any position.

The machine is furnished with a ball-bearing motor and V-belt drive. An automatic push-button starter is mounted on the base.

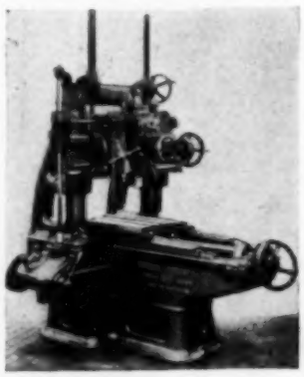
— 4 —

## Boring Machine, Jig

*R. Y. Ferner Co., Investment Building, Washington, D. C.* [Vol.71,p.376]

The Societe Genevoise d'Instrument de Physique, Geneva, Switzerland, through its U. S. and Canadian representative, is offering models of its jig boring machines Nos. 4 and 5, designated as MP4B and MP5B. Numerous improvements are embodied in the various parts of these models, which have been enlarged and strengthened.

The size of the high-speed spindle has been increased. The drilling and boring capacity covers a range from $\frac{3}{4}$ in. to ½ in. with 9 speeds available for this spindle, varying from 212 to 1870 r.p.m. The range of nine speeds for the main spindle has also been increased, to give speeds varying from 45 to 400 r.p.m. and these nine speeds are available on the No. MP4B ma-



chine as well as the larger model.

The drilling capacity of the main spindle is increased to 1¾ in. in cast iron and 1¼ in. in soft steel, while the boring capacity is now 6 in., increases varying from 25 to 50 per cent.

The distance between the vertical housings and the width of the table have also been increased.

Improvements have also been made in the circular tables provided with the machines. The shaft of the worm screw has been designed to permit the quick attachment of any of a set of 3 indexing disks, which makes it possible to lay out in a circle any number of holes from 2 to 100 without the necessity of making the necessary calculations for the successive settings. These index plates can be attached without removing the micrometer head, and a special device permits use of the micrometer head for any special setting while the index plate is still in place.

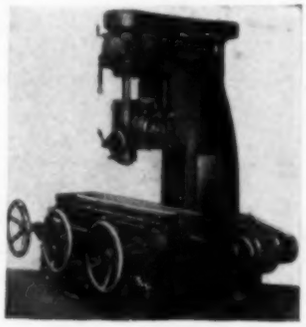
— 5 —

## Boring Machine, Jig, and Vertical Miller, No. 5

*Reed-Prentice Corporation, Worcester, Mass.* [Vol.71,p.485]

A machine which is capable of vertical milling, with precision to meet the requirements of jig-boring work, has been placed on the market. This machine weighs 11,000 lb. and occupies a floor space of 100x 95 inches.

As a jig borer, the machine will bore, drill, and ream. In addition, it will mill die shoes, rout out recesses, bore leader



pin holes, and do necessary precision drilling, reaming, and boring in jigs and fixtures.

Power down feed for the spindle is built into the head. There are three feeds. The extra equipment supplied with the machine consists of a rotary table, 20 or 24 in. in diameter, graduated to 360 deg., with a micrometer dial, hand or power feed, and a sub-table.

The speed box has Timken bearings on all shafts. Gears are of S.A.E. 6250 nickel-chromium steel, hardened and running in oil. All shafts are of the multiple-splined type. The speed plate shows eighteen spindle speeds, from 17 to 600 rev. per minute.

Specifications: Longitudinal power feed, 48 in.; cross power feed, 16 in.; vertical adjustment head on column, 15 in.; vertical feed on spindle, 9 in.; maximum distance end of spindle to table, 20 in.; throat depth, 20 in.; distance center line of spindle to face of column, 11¼ in.; rapid power traverse, longitudinal, 100 in. per min.; cross, 100 in. per min., and working surface, 60x 16 inches.

The feed box is a self-contained unit giving eight feeds for each spindle speed.

— 6 —

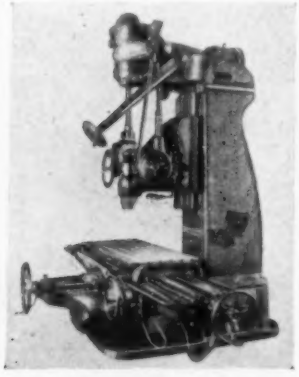
## Boring Machines, Jig, Nos. 3 and 3-A

*Pratt & Whitney Co., Hartford, Conn.* [Vol.71,p.497]

This large jig borer embodies the same fundamental system of locating and using end measures, inside micrometers, and

dial indicators as other Pratt & Whitney machines. It has the same features of locating to tenths, boring where it locates, and then checking its own work to tenths without changing the work setup. Machines are made only for motor drive. The motor has four speeds, giving eight spindle speeds with the back gears.

Dimensions of the No. 3 machine are: Table working surface, 24x48 in.; table travel, 42 in. longitudinal and 24 in. traverse; table top to spindle end, 4 to 30 in.; head travel, 17 in.; quill travel, 9 in.; spindle center to column, 22 inches.



The 3A machine has a 24x60 in. table with a longitudinal travel of 54 in., other dimensions being the same as on the No. 3 machine. Spindle speeds are 40 to 525 r.p.m.; feeds, 0.0025 to 0.010 in. per rev. The No. 3 weighs 15,000 lb., and the No. 3A, 15,500 pounds.

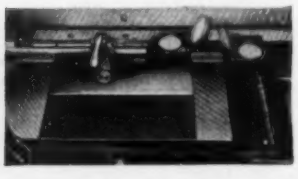
— 7 —

## Boring and Milling Attachment

*Reed - Prentice Corporation, Worcester, Mass.* [Vol.71,p.791]

Longitudinal and cross table indicating devices have been developed for use on the No. 5 jig boring and vertical milling machine, manufactured by the Reed - Prentice Corporation, Worcester, Mass.

For accuracy, as in jigs and fixtures, brackets with V-blocks



are provided for holding end measures and differential micrometer heads. These end measures and micrometer heads are placed between the adjustable stops and the dial gages attached to the saddle. Two differential micrometer heads with twelve end measures provide adjustments ranging from 1 to 12 in. by one-tenth of a thousandth. Holes are located in either direction, cross or longitudinal, with direct readings. Positioning the table and work is controlled by end measures, inside micrometers, and dial indicators—not by means of cross or longitudinal feed screws. A clamping or locking device is also provided for clamping the table.

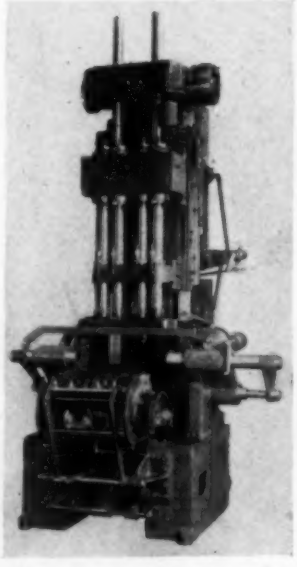
— 8 —

## Boring Machine, Cylinder, "Hole Hog," No. 14

*Moline Tool Co., Moline, Ill.* [Vol.71,p.510]

This machine is intended for high production on a definite set-up. The design includes the use of Timken bearings for all the spindles, which are adjustable for wear.

In general, the machine is similar to other "Hole Hog"



boring machines, in that the double V-guide construction is used, as well as the Oilgear feed mechanism.

The motor is mounted on top of the column and transmits power to the main drive shaft through a Morse silent chain. The power is transmitted from the main horizontal drive shaft to the two vertical intermediate shafts through hardened steel and bronze spiral gears running in oil. These two vertical shafts are multi-splined, and on their ends are mounted hardened steel pinions meshing with the gears on spindles.

Six of these machines constitute a battery; two roughers, one for one series of holes, two machines for the semi-finishing, and two for the reaming operations.

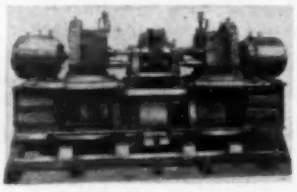
Specifications: Travel of head, 24 in.; width of V's, 27 in.; length of slide, 48 in.; power required, 25 hp.; spindle construction made to suit; weight, complete with fixture and tools, 17,350 pounds.

— 9 —

## Boring Machine, Special, Improved, No. 25 HH

*Baker Brothers, Inc., Toledo, Ohio.* [Vol.71,p.517]

An adaptation of the No. 25 HH two-way, heavy-duty hydraulic-feed machine, this machine is equipped for drilling the kingpin hole in steering knuckles. Two steering knuckles are chucked, and drilled simul-



taneously from the two ends. The fixtures shown are of the stationary type, but the same machine can be furnished with a 180-deg. indexing fixture, which allows of the chucking of two knuckles while two others are being drilled.

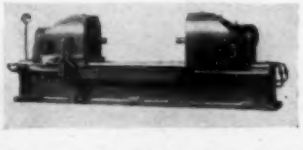
This machine is furnished with two motor-driven Oilgear pumps, each opposed, two spindle head is arranged with individual direct-connected motor-drive. The spindle heads are made separately from the saddle so that different centers can be adapted to the standard end units.

— 10 —

## Boring and Reaming Machine, Horizontal, Two-Way-Opposed

*Defiance Machine Works, Defiance, Ohio.* [Vol.71,p.950]

This two-way-opposed, horizontal boring and reaming machine was designed for production of automobile parts, gas engines, tractors, transmission cases, and similar work requiring boring and reaming operations, as well as a power unit for driving multiple - spindle drill-heads. The machine is built with a single-spindle head. The head can be made with any diameter spindle or as many spindles as desired. Heads are inclosed and have stub-tooth, heat-treated gears having splash or force feed lubrication. Minimum distance between the noses of spindles is 29½ in., the maximum distance being 57½ in. The height from the top of



the ways to the center of the spindle is 12 inches.

The machine is equipped with an Oilgear pump or can be supplied with special mechanical feed.

The length of bed, the diameter and height of the spindle centers, the number of spindles in each head and fixture are designed and built to suit the customer's particular requirements. Specifications of the machine shown are: Floor space occupied, 13 ft. 10 in. x 55 in. wide; net weight, 9,710 pounds.

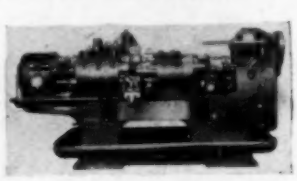
— 11 —

## Chucking Machine, Hydraulic, Five-Spindle, 7-Inch, Model M

*Cleveland Automatic Machine Co., Cleveland, Ohio.* [Vol.71, p.715]

Embodying complete means for hydraulic operation in the rapid machining of castings, forgings, and similar products, both first and second operations, a 7-in. Model M chucking machine has been announced. Hydraulic chucking is conformable to variations in the diameters of castings or forgings and provide a constant positive force sufficient to hold the work against the maximum cutting feed of the tools. In addition, it can be adjusted to a lighter grip for work. An extra attachment to the tool turret has been provided.

Tooling sequence of the standard machine provides for standard tools in the Nos. 1 and 2 positions that advance with the turret at the same feed per revolution. In the Nos. 3 and 4 positions (upper rear and top) the tools are clamped in independent revolving spindles, moving longitudinally in the tool turret, but individually controlled by levers, actuated



from a drum and cams, mounted on the upper cam shaft.

The loading station is the upper front, or fifth position, and is also controlled independently, but does not revolve. Spindles 3, 4, and 5 can be cammed to complete their operations ahead of, or at the same time as, the other cutting tools. Threading, tapping, or extra revolving spindles can be arranged for if desired.

Stop-spindle mechanism is entirely automatic and is controlled from an independent oil cylinder. Spindle change gears are provided to cover a range of twenty speeds from 61 to 756 r.p.m.

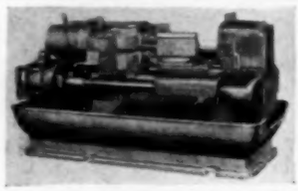
Tool feed is independent of the high-speed indexing movement and is controlled by trip pins carried in T-slots in the face of the wormwheel.

— 12 —

### Screw Machine, Automatic, Four-Spindle

*Greenlee Bros. & Co., Rockford, Ill.* [Vol.71,p.789]

Offered in two sizes, both of which are equipped with a lead-screw threading mechanism that permits the use of threading, tapping, reaming, chamfering, corner rounding, and other tools in the third and fourth positions, this four-spindle automatic screw machine has been placed on the market. This



mechanism is useful for cutting short threads without damaging the lead of the first thread. The two sizes will chuck 1¼- and 1¾-in. round stock, respectively.

Each of the forming slides is handled individually for independent operation. The tool slide permits the use of end-working tools in all positions. All threading and tapping can be handled in either or both the third and fourth positions. Cams are easily changed and are also interchangeable.

The slide is controlled by a rack and intermittent gearing. An adjusting dog on the feed worm gear takes care of all setting for the various lengths of feed.

A push-button motor control, cutting-compound control valve, and a feed start and stop lever are accessible from either side of the machine.

Specifications for the 1¼- and 1¾-in. machines are: Chuck capacity, rounds 1¼ and 1¾ in.; chuck capacity, hexagons, 1⅛ and 1½ in.; chuck capacity, squares, ⅞ and 1⅛ in.; stock feed, 7½ and 9 in.; milling, length 6 and 7½ in.; motor size 7½ and 10 in.; speed of motor, 1,200 r.p.m. Floor space, length with stock reel 15 and 13½ ft.; length without stock reel, 8½ and 9½ ft.; width, 46 and 57½ in.; heights, 4½ and 5 ft.; approximate weight, belt drive 7,800 and 11,700 lb.; approximate weight, motor drive, 8,250 and 12,000 pounds.

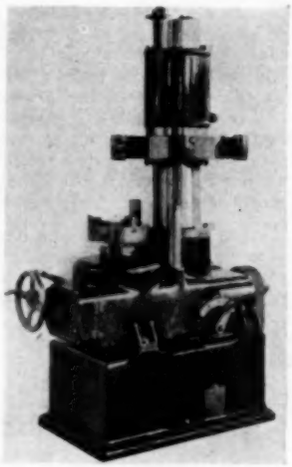
— 13 —

### Chucking Machine, Vertical

*Production Machinery Sales Co., 4845 St. Aubin Ave., Detroit, Mich.* [Vol.71,p.791]

A vertical chucking machine that will perform any operation such as turning, boring facing, drilling, counterboring, recessing, threading, and similar operations, within its range, is being built by the Columbia Machine Tool Company. The machine is designed to conserve floor space, and to make possible the arrangement of any number of machine units either in line or in horseshoe formation, with a maximum distance of but 36 in. between spindles on adjacent machines. Thus, one operator can handle several machines easily.

The machine base is low hung, and is of sturdy con-



struction. All shafts are mounted in Timken tapered roller bearings, including the vertical spindle. All spindles operate in a flood of oil. It is understood that spindle speeds of up to 2,200 r.p.m. can be obtained.

Levers for control of the machine are conveniently located. The machine can be supplied with hand or power feed, or with hydraulic feed to the turret.

The machine will chuck work up to 16 in. in diameter, and will drill or bore to a depth of 9 in. The machine can be furnished with a longer column to bore to any reasonable depth. It will accommodate any standard tool used on machines of this type, and can also use an air chuck, lever draw-in or push-out collets, or special features.

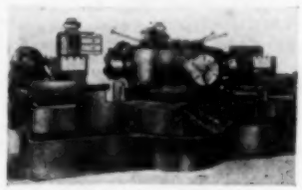
The drive is by self-contained motor through V-type cog belts. Floor space required is 26x42 inches.

— 14 —

### Chucking Machine, Work-Rotating, No. 6

*Goss & DeLeeuw Machine Co., New Britain, Conn.* [Vol. 71,p.474]

The No. 6 machine is a departure in chucking-machine design. Four work spindles are supported in a horizontal turret 90 deg. apart, and present the work to three sets of tools for simultaneous operation. The work is loaded in, and removed from, the chuck at the front.



Power for driving the work spindles is secured from the main 15-hp. motor. A silent chain transmits the power from the motor to a vertical shaft under the center of the turret, from which power is taken for each of the spindles. A 2 to 1 back gear gives a fast or slow spindle speed for each combination of change, or pick-off, gears. Spindle speeds have a normal range of from 16 to 525 rev. per minute.

A second motor furnishes power for the various feeds and for indexing the turret. The third motor, on the rear tool slide, is for special work where drilling or high-speed boring is part of the operation at that station.

For threading, either internal or external, the regular Goss & DeLeeuw thread-cutting head with reversing motor can be mounted on either of the toolslides. A fourth motor drives the coolant pump.

The chucks are nominally 12 in. in diameter, but chucks up to 20 in. can be used. All feed movements are secured direct from solid barrel track cams mounted beneath the toolslides, which have either longitudinal or vertical motion, or both, and can be made in almost any combination desired. The vertical toolslides are also controlled by a solid barrel track cam.

Weight, about 13 tons.

— 15 —

### Automatic, Vertical, Six-Station, No. 2

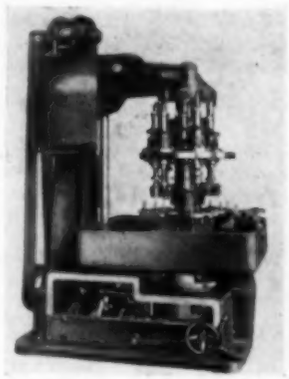
*Pratt & Whitney Co., Hartford, Conn.* [Vol.71,p.867]

Flexibility in set-up and high-speed operation are the chief features of this machine, which will perform a large variety of operations, including milling, drilling, sawing, facing, threading, tapping, hollow milling, reaming, serrating, knurling, and boring. Five of the stations are tooled and the sixth is for loading. Multiple cutting tools on a single spindle and multiple-drill units, combination facing and drilling devices, and others may be used.

The vertical automatic is designed for individual motor drive. A 7½-hp., constant-speed motor, not supplied, is mounted on top of the column. By means of the two sets of change gears, the speeds of the spindles and the table are controlled separately.

The work tables index progressively from one spindle to another and are locked in each position automatically. The vertical movements of the work during cutting are controlled by cams.

The spindles are carried in a large circular bracket and are



supported rigidly in sleeves mounted in ball bearings. Each spindle is threaded its entire length so that the tools it carries can be positioned vertically and locked in place. During operation the spindles revolve, but do not move up and down.

Specifications: Maximum distance from flange of work-holding spindle to flange of cutter spindle, with work-holding spindle in lowest position, 14⅛ in.; maximum travel of work, 3½ in.; maximum adjustment of cutter spindle, 6½ in.; maximum work diameter swing, 8⅞ in.; length and depth, 40x74 in.; height (not including motor), 81 in.; weight, without motor and tooling, 6,750 lb. net.

## *Drilling Machines*

— 16 —

### Drill, Sliding-Head, 14-Inch

*Buffalo Forge Co., Buffalo, N. Y.* [Vol.71,p.495]

This machine comes in both bench and pedestal types. Specifications common to the two types are: Distance from column to center of spindle, 7⅛ in.; travel of spindle, 3½ in.; largest drill used, 7/16 in.; maximum speed, 10,000 r.p.m.; drive pulley speed 1,800 r.p.m.; four spindle-speeds, 9,200, 6,900, 4,000, and 3,000 r.p.m.; chuck capacity, ⅜ in.; diameter of spindle, ⅝ in.; power required, ½ horsepower.

Other specifications for the bench-type machine are: Max-

imum distance, chuck to table, 11 in.; working surface of table, 14x14 in.; size of table, 19x22½ in.; total height, 44 in.; net weight, approximately 260 lb.

For the pedestal-type machine the specifications are: Maximum distance from chuck

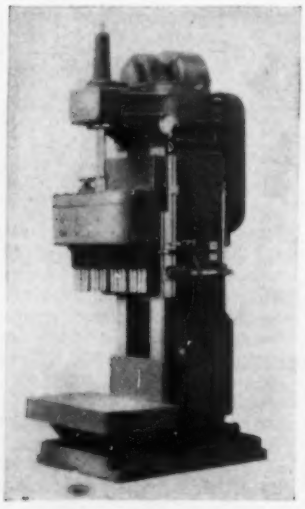
to table, 30 in.; working surface of table, 18x14 in.; size of table, 22x19 in.; floor space, 20x26 in.; total height, 81 in.; net weight, 500 pounds.

— 17 —

## Drilling Machines, Hydraulic- and Mechanical-Feed, No. 16

*Foote-Burt Co., Cleveland, Ohio.* [Vol.71,p.496]

Both machines have a standard base, upright, and drive brackets, but the table, head, drive, and feed and speed arrangements are varied to suit the work. The column and base are separate castings. Although slideable, the standard table is usually held in one position by spacer blocks. Heads are individually designed with special gearing to secure the correct speeds and locations of the spindles. All spindles have ball



thrust bearings and can be equipped with adjustable collets. Lubrication of the head is by means of a forced-feed oiling system.

Feed for the No. 16 mechanical-feed unit is taken from the main horizontal shaft through several intervening means to a steel rack mounted on the slide. The standard length of travel is 16 in. Fast traverse in either direction by hand is by means of handles.

The No. 16 hydraulic-drive unit is usually equipped with an Oilgear type QM pump having a 5¼-in. cylinder with 16-in. stroke. Fast traverse forward feed is at 175 in. per min., followed by two slow feed forwards of 1 to 13 in. per min., two slow feed returns of 1 to 13 in. per min., and a fast traverse return of 250 in. per min. Delayed reverse action can be obtained if desired.

Specifications common to both machines are: Length of slide, 40 in.; slide travel, 16 in.; base to drive bracket, 89⅜ in.; height of table to floor, minimum, 19½ in.; working surface of table, 25x40 in. The approximate heights of the hydraulic and the mechanical units are 127 and 123 in., respectively.

— 18 —

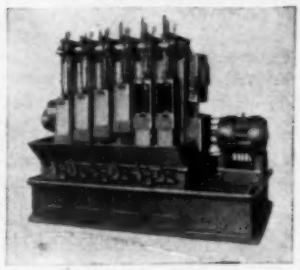
## Drilling Machine, Vertical, Deep-Hole, Six-Spindle

*Pratt & Whitney Co., Hartford, Conn.* [Vol.71,p.500]

The six-spindle, vertical, deep-hole driller uses the well known rifle-barrel method of drilling. The driller consists of a heavy cast-iron bed, on which is mounted a rigid column. This column carries the six work-spindle slides together with their individual drive mechanisms. The six drills remain stationary, and are mounted vertically on the bed beneath the spindles.

The work-holding mechanism used varies according to the work being drilled. The spindles rotate the work in the fixture at the correct drilling speeds, and the six work-slides feed down independently under power. On the rear of the bed is the pump-drive compartment containing the six high-pressure oil pumps, one for each drill, and the large motor which drives all six pumps through gearing.

The drills are of special design and consist of a hollow shank to which is brazed a short, high-speed-steel, drill tip. The shank is made as long as required, with a groove pressed into one side so that oil can be forced through the inside to the drill tip under high pressure and returned outside through the groove. The drill tip is made with a hole through it corresponding to the inside of the shank, and a groove is cut



in its side which lines up with a groove in the shank. The tip is ground to a special form that will cut a clean true hole, and deliver the chips well broken up so they will flow out easily with the oil. Oil under pressure of 500 lb. or more is used.

A power knock-off is provided at the butt end of each drill, which stops automatically the spindle motor, the feed, and the oil after the drilling operation is completed.

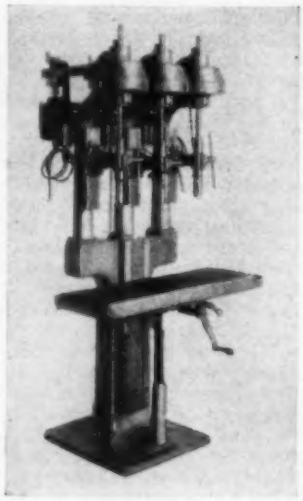
— 19 —

## Drilling Machines, Upright, Multiple-Spindle

*Canedy-Otto Manufacturing Co., Chicago Heights, Ill.* [Vol. 71,p.509]

These machines may be had with two, three, four, or six spindles. Each spindle has an individual motor drive; all spindles have ball-thrust bearings and are supported by sleeves with long bearings.

A large adjustable oil-grooved table is provided. Drills come equipped with necessary power cords and toggle switches. They



may be obtained in either the bench or the pedestal type.

Speeds varying from 400 to 10,000 r.p.m. may be obtained in groups of three speeds. All tables are 16 in. wide, but vary from 20 to 72 in. in length, depending upon the number of spindles. For the two slower-speed machines, the spindles take No. 1 and No. 2 Morse taper shanks, and the machines have a maximum drilling capacity in steel of ½ in. Both high-speed machines use Jacobs chucks and have a maximum drilling capacity, in steel, of ⅜ in. and ⅞ in., respectively.

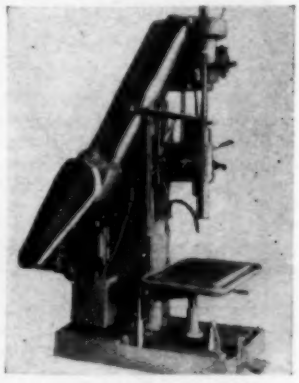
Net weights vary from 575 to 2,050 pounds.

— 20 —

## Drilling and Tapping Machine, Self-Oiling, Sliding-Head, No. 262

*Barnes Drill Co., Rockford, Ill.* [Vol.71,p.509]

This machine is built with a box-section column and head. Eight quick-change, geared speeds have their lever controls extended to the front for the convenience of the operator. Eight spur-geared feeds, with lever quick-change controls, are



manipulated from the front of the machine. The base is surrounded by oil channels and has a sump for coolant. Silent, inclosed, chain drive or single-pulley drive is furnished.

The spindle is of six-spline construction, and has a roller thrust bearing. Regular spindle travel is 15½ in. Regular travel of the sliding head is 19½ in. The spindle sleeve has a split bearing to take up wear. Every bearing is oiled automatically.

The machine takes high-speed twist drills up to 2½ in. and bores an 8-in. hole in cast iron. Spiral crown gear ratios are 1 to 1, 2 to 1, and 3 to 2.

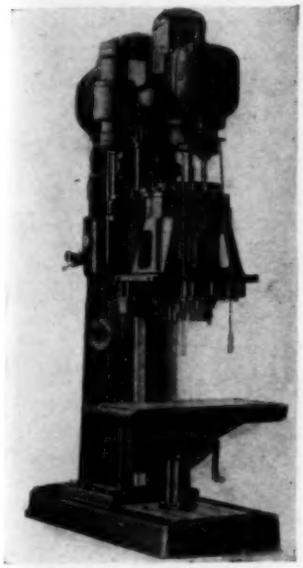
Specifications: Height, 94 in.; column to center of table, 13 1/16 in.; vertical travel of table, 17½ in., maximum distance from spindle to base, 50 in.; net weight, 3,500 pounds.

— 21 —

## Drilling Machine, Multiple-Spindle, Model D 13 H

*National Automatic Tool Co., Richmond, Ind.* [Vol.71,p.526]

The model D 13 H multiple-spindle machine is of medium size, and is equipped with hydraulic feed. Three sizes of heads have been designed for use with this unit. They are 12x18 in., rectangular bored for 24 spindles, 16x24 in., rectangular bored for 22 or 12 spindles, and 18 in., round bored for 12



spindles. The latter two are of the heavy-duty type.

An adjustable knee-type table is supplied. Two 5-in., low-pressure oil cylinders give the hydraulic feed. The control of this feed is simple and positive throughout. The movements are rapid down, feed, rapid up, and stop.

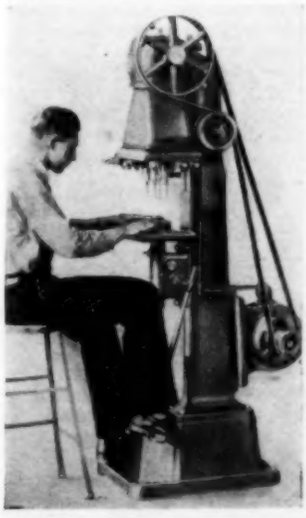
Specifications: Center of head to face of column, 15½ in.; top of base to top of table, maximum, 39¼ in., minimum, 22 in.; working surface of table 40x23 in.; travel of head, maximum, 19 in.; height of machine, head up, 139 in.; feed, power range, 0 to 15 in. per min.; rapid traverse, 90 in.; floor space, 34x85 in., and weight, 11,500 pounds.

— 22 —

## Drilling Machine, Multiple-Spindle, Model C-5

*National Automatic Tool Co., Richmond, Ind.* [Vol.71,p.526]

The model C-5 is a small sensitive driller with either hand or foot feed and may be equipped with a tapping attachment. It stands 5 ft. 11 in. high and may be had with either belt drive or belted motor drive. It has a capacity of ten ¼-in. drills in cast iron or ten ⅞-in. drills in steel, and may be had either with or without a coolant system. The elevation of the table may be obtained through a hand lever or a treadle.



Floor space, 20x24½ in.; weight, 1,800 pounds.

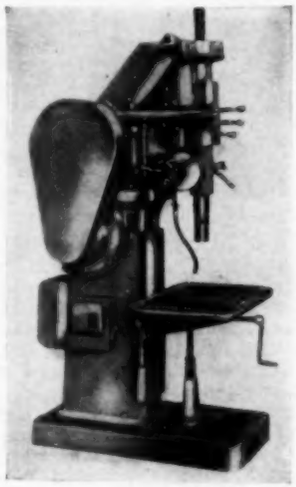
— 23 —

## Drilling and Tapping Machine, Upright, Production-Type, All-Geared, No. 221½

*Barnes Drill Co., Rockford, Ill.* [Vol.71,p.679]

Arranged for drilling 1½-in. holes in mild steel to the center of a 22-in. circle, the No. 221½ driller and tapper has eight speeds and eight feeds that may be changed quickly through control levers. A ratio of 4 to 1 is given by the backgears. The principal feature is the use of "Nitralloy" steel for the spindle and sleeve.

Timken bearings are used on all speed change shafts and for the spiral crown gears. Ball bearings are employed for the drive shaft. Speed change gears are cut from chrome-nickel steel. Crown gears are of forged steel having spiral teeth.



An automatic reverse feature for tapping is quick in action, giving the reverse speed in the ratio of 1¾ to 1. The drive is by means of Texropes.

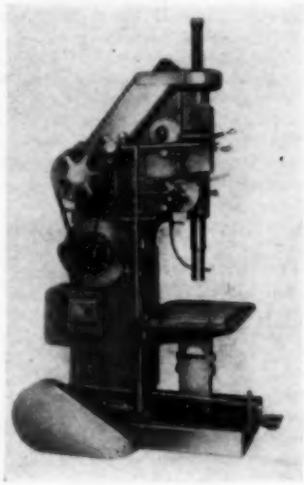
The principal dimensions are as follows: Height of drill to top of bonnet, 100 in.; distance of column to center of table, 11¼ in.; maximum distance from No. 4 taper spindle to regular table, 31 in.; maximum distance from spindle to base, 46¼ in.; vertical travel of spindle, 14 in.; vertical travel of table, 23 in.; size of regular table, 26x16 in.; floor space 47x24 in., weight, with coolant pump and motor drive, net, 2,700 pounds.

— 24 —

## Drilling Machine, Upright, All-Geared, Production-Type No. 242

*Barnes Drill Co., 814-830 Chestnut St., Rockford, Ill.* [Vol.71,p.755]

Holes from ¾ to 2 in. in diameter can be drilled in mild steel on the No. 242 unit, which has a 2-in., six-splined, hardened, steel spindle and a 16 in. spindle travel. Eight quick-change-geared speeds are controlled from the front by means of levers. There are also eight spur-geared feeds of the quick-change type.



Timken bearings are used for all speed-change shafts and for the spiral crown gears. Ball bearings are employed for the drive shaft and for the hand-wheel shaft. Roller bearings take the spindle thrust. The speed-change gears are cut from chrome-nickel steel and are heat-treated. Crown gears are forged and cut with spiral teeth and then hardened. Threaded collars are used for ease of adjustment of the Timken bearings. An automatic reverse feature for tapping is applied, and it is very quick in action, giving a reversing speed of 1¾ to 1.

Specifications: Distance, column to center of table, 12¼ in.; table working surface, 28x18 in.; vertical travel of spindle, 16 in.; vertical travel of table, 23 in.; speed of drive pulley, 400 r.p.m.; floor space, 50x35 in.; weight, 3,250 pounds.

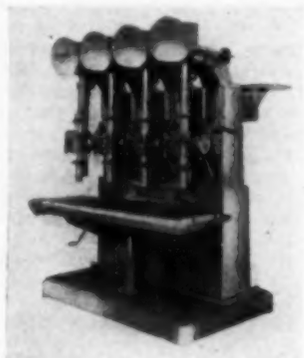
— 25 —

## Drilling Machine, Upright, Production-Type, 24-Inch, No. 1 A

*Edlund Machinery Co., Inc., Cortland, N. Y.* [Vol.71,p.794]

Up to four spindles may be provided on this No. 1A, 24-in. production-type drilling machine. The machine may be furnished with either hand or power feed, but not with a tapping attachment. Spindles may be either No. 3 or No. 4 Morse taper and may have flanged quills if required. Riser blocks may be used.

The motor for this machine is mounted on a sliding bracket.



Adjustment of the alignment of the motor shaft and drive shaft may be made without the use of shims. The motor is connected to the drive shaft through a flexible coupling.

Hardened steel change gears are used. These gears are broached with two keys. Any feed, ranging from 0.006 to 0.028 in. per revolution may be obtained. Both the sliding arm and the power-feed worm gear box assemblies are the same on the No. 4B machine.

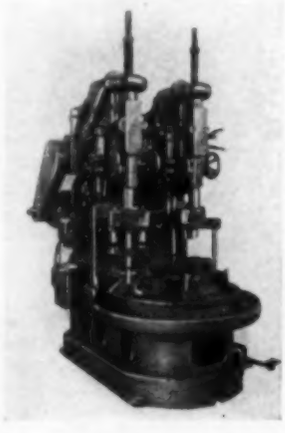
The machine is open in the back to allow for the use of extra counterweights for multiple-head drilling. When a coolant system is required, a bracket is mounted at the side of the base to carry an independent pump.

— 26 —

## Drill, Gang, Production, Two-Spindle, No. 242

*Barnes Drill Co., 830 Chestnut St., Rockford, Ill.* [Vol.71, p.949]

Either three of four stations under hydraulic control may be had on this special No. 242, two-spindle, special, production gang drill. The entire hydraulic



mechanism is inclosed within the frame. Other features are the inclosure of the spindle sleeve and spindle between the upper crown gear housing and the spindle sleeve bearing in each gang head. This construction also makes it possible to self-oil the spindle in the sleeve. Roller bearings are carried in recesses in each end of the spindle sleeve and contact directly on the spindle, with no casing nor raceways for the rollers.

The gang drill is equipped with a cam feed for the first spindle, giving rapid approach, feed at a predetermined rate, dwell for facing, and a quick return. The second spindle also has a cam feed for both reaming and tapping, according to the setup required. The machine also is equipped with a hydraulic mechanism for throwing the multiple-disk clutches, which control all speeds and all feeds. The unit can be changed easily from one set up to another, and can be provided with spur geared feeds.

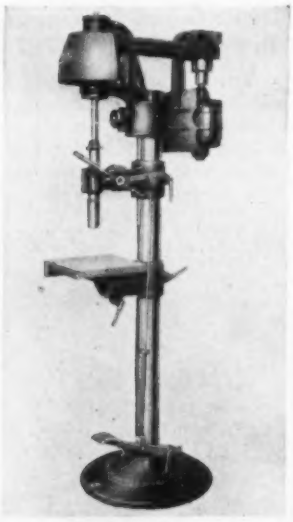
Specifications: Height of machine, 120 in.; diameter of spindle nose, 3 3/16 in.; diameter of spindle sleeve, 3 1/4 in.; spindle taper, No. 5; vertical travel of spindle, 16 in.; diameter of table, 54 in.; floor space, 90 x 56 in.; weight, with 10-hp. motor and all attachments, 9,760 pounds.

— 27 —

## Drilling Machines Sensitive

*Buffalo Forge Co., Buffalo, N. Y.* [Vol.71,p.224]

These drilling machines will drill 1/4- to 3/4-in. holes of cast iron, and have been designed for high-production operations.



Head brackets are made of cast iron and the column of steel. The outer part of the spindle is guided by a sleeve running in bronze bearings. The drilling machines are made in a bench type, having a hand-lever feed, and a floor type having a hand lever and treadle. Ball bearings of S.K.F. type are used throughout.

Specifications of both the floor- and bench-type machines are: Capacity, with 1/3-hp. motor at 1,725 r.p.m., holes in steel, 1/8 in. holes in cast iron, 3/8 in.; with 1/2-hp. motor, holes in steel, 5/16 in., in cast iron, 7/16 in.; drills to center of 16-in. circle; spindle speeds, 418,835, and 1,725 r.p.m.; travel of spindle, 7 in.; spindle bored No. 2 Morse taper; steel column, 4 in. in diameter.

Additional specifications of the floor-type are: Greatest distance, base to spindle, 46 in.; greatest distance, table to spindle, 38 in.; adjustment of head, 8 1/2 in.; tilting table, 12 in.; square base, 21 in. in diameter; weight, 400 pounds.

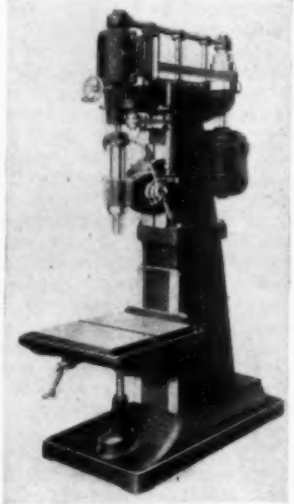
Additional specifications of the bench-type are: Greatest distance, table to spindle, 28 in.; table, stationary; base of table, 15 3/4 x 22 1/2 in.; table working surface, 12 3/4 x 12 3/4 in.; weight, 350 pounds.

— 28 —

## Drilling Machine, Sensitive, 7/8-Inch, "High-Power"

*Henry & Wright Manufacturing Co., Hartford, Conn.* [Vol.71,p.490]

The base is a heavy, box-type casting, the lower end being cast to provide a coolant reservoir. The table is a large, ribbed



casting. The belt driven, hand-feed, single-spindle machine contains eleven ball bearings. The arm has a long bearing surface, and is fastened by a quick-acting clamp.

The spindle is an alloy-steel forging, dynamically balanced. The standard spindle nose is furnished with a No. 2 Morse taper. Six splines are used at the upper end.

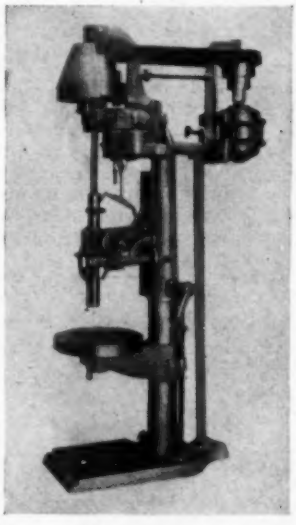
Four spindle speeds are obtained, ranging in geometrical progression from 620 to 1,800 r.p.m., and, with the back-gears, four additional geared speeds may be had. Spindle travel is 7 in. A power feed attachment gives full control of the feed. Feed may be instantaneously changed from semi-automatic to full automatic or to hand. Standard feeds are 0.004, 0.008, and 0.012 in. per revolution.

— 29 —

## Drill, Sensitive, Back-Geared, Sliding-Head, 21-Inch

*Canedy-Otto Manufacturing Co., Chicago Heights, Ill.* [Vol. 71,p.518]

Manufactured to drill to the center of a 21-in. circle on the gib and capable of handling work 23 in. in diameter, the



Type C-O, 21-in. sliding-head, backgeared, self-feed drill is equipped with motor drive similar to the 15-in. machine. Backgears are confined within a cone pulley, are made of steel and bronze, and are engaged or disengaged by a single-lever control. Four changes of feed are provided. The machine allows a 12-in. spindle travel and a 16 1/2-in. vertical adjustment of the head. The spindle will take a No. 4 Morse taper shank, and will handle drills up to 1 1/4 in. in diameter.

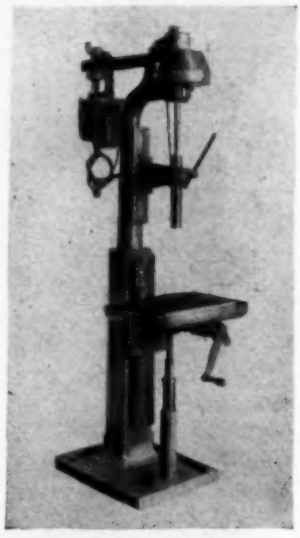
The table is 17 in. in diameter. Spindle speeds varying from 260 to 1,580, with back-gears out, and from 73 to 425 r.p.m. with backgears in, are provided. Floor space required is 17 1/2 x 43 in. A 1-hp. motor is used. The weight is 890 pounds.

— 30 —

## Drilling Machine, Sensitive, Sliding-Head, 15-Inch

*Canedy-Otto Manufacturing Co., Chicago Heights, Ill.* [Vol. 71,p.524]

The 15-in. sensitive drill is mounted on a box-type column, and is designed and constructed



to give accuracy and speed in drilling holes up to 1/4 in. in diameter. The spindle has a ball-thrust bearing, and is supported by a sleeve with long bearings. The cone pulley rotates on Timken bearings. The table is reinforced, has a large oil groove, and is mounted on a screw jack for adjustment.

The drill comes equipped with necessary lighting cords, and toggle switch. Speeds vary from 400 to 10,000 r.p.m. The drill weighs 505 pounds.

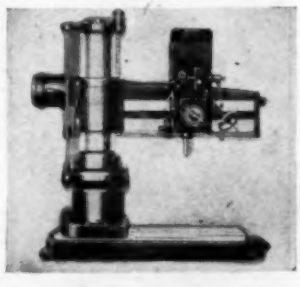
— 31 —

## Drill, Radial, "Super-Service," 11-Inch Column

*Cincinnati Bickford Tool Co., Cincinnati, Ohio.* [Vol.71,p.482]

This machine is built with 3- or 4-ft. arms and with 24 speeds in the head from 29 to 1,850 r.p.m. The arm is of full box section. Complete centralized control is a feature. All speed and feed changes are made in the head through selective sliding gears. Column clamping is controlled at the head.

The arm is raised or lowered and clamped or unclamped by levers near the spindle. An interlocking arrangement prevents raising or lowering the arm while clamped, but when un-



clamped, it is easily raised or lowered by multiple-disk clutches.

Ample lubrication facilities, including an oil filter, insures operation over a long period

without oiling. The entire drive is mounted on standard ball and roller bearings.

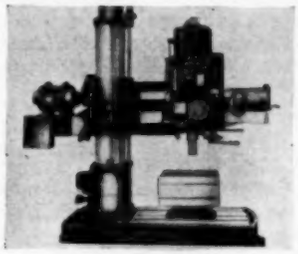
A rapid hand-traverse for the head has been developed, which makes a power-traverse attachment unnecessary on machines of this size. All shafts are ground and multiple-splined with integral keys. One motor, of constant-speed type, drives the entire machine.

— 32 —

## Drilling Machines, Radial, 11- and 13-Inch, "Mor-Speed"

*Morris Machine Tool Co., Cincinnati, Ohio.* [Vol.71,p.756]

Centralized control is featured in the 11- and 13-in. radial drills, which are similar in design to the 9-in. unit manufactured by the company. Only one constant-speed motor, mounted on the arm, is required to run the machine, including the elevating attachment. There are 27 speeds and twelve feeds and



all speed and feed changes are located in the head. They can be changed without the operator leaving his drilling position.

The tapping attachment is a multiple-disk clutch with an all-metal disk. The spindle can be started and stopped or reversed instantly.

The arm is raised, lowered, and clamped with a single lever. Both the inner and the outer columns are mounted on special radial and thrust ball bearings. An electrical head-traversing device and a column clamp operated from push-button stations on the head can be furnished. All moving parts are continuously oiled. A plain box table or a universal table can be furnished, as desired.

— 33 —

## Drilling Machines, Radial

*United Machine Tool Corporation, 75 West St., New York, N. Y.* [Vol.71,p.790]

Simplicity of the saddles, centralized control, and ease of adjustment are the features of the Models ERB-40 and ERB-70 radial drilling machines, manufactured by Franz Braun, A. G., Zerbst, Germany.

Easy swiveling of the arm on the column is a feature. In the Model ERB-40, the lower end of the outer column of the double column runs on rollers held in a cage, while on the Model ERB-70 it is supported on two adjustable rollers running on ball bearings.

The saddle or head is made in two sizes. It traverses along the arm by means of a hand-

wheel. The spindle is fitted with a No. 4 or a No. 5 Morse taper. It has a vertical traverse of 12 in. for the Model ERB-40 and 15¾ in. for the Model ERB-70.

Three means are provided for the control of the feeds, two manual, and one automatic or power feed: the double-ended lever for rapid control; the small handwheel for accurate spotting, and the power lever for adjusting or changing the automatic feed. The one speed given by a constant-speed motor on the Type ERB-40 is 750 r.p.m., and on the ERB-70, 500 rev. per minute.

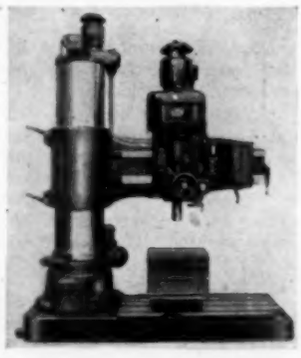
The Model ERB-40 is equipped with a 3-phase, 60-cycle, 220-volt, 3-hp. 2,800 r.p.m., a.c. motor of the squirrel-cage or slip-ring type. A reversing-type starter fuse box and main switch are supplied. The Model ERB-70 has a 5½ hp., 1,450 r.p.m. motor for the same type of circuit.

— 34 —

## Drilling and Tapping Machines, Radial, Model SRB

*United Machine Tool Corporation, 75 West St., New York, N. Y.* [Vol.71,p.875]

Simplicity of the saddles, centralized controls, and ease of adjustment are the principal features of the Braun Model SRB radial drilling and tapping machines recently introduced into the United States. High operating efficiency is obtained by



mounting the motor on the top of the saddle whence the flow of power is as short as possible, and by using ball bearings in the gearbox. The machines are manufactured in Germany by Franz Braun, A. G., Zerbst.

The Braun column is made in two pieces. On the inner column the outer column with the arm swings a full 360 deg. The upper portion of the outer column is fitted with radial and thrust ball bearings, and the lower portion is supported on two adjustable rollers running on ball bearings. An electrically controlled clamping device can be furnished.

The saddle is made in two sizes. It traverses along the arm by a handwheel located on the same shaft as the double-ended lever controlling the quick vertical adjustment of the spindle. Thus, the two most important means of control are located one behind the other on the machine.

Roller bearings, ball bearings, and plain bronze bearings are used on the drill spindle, which has six splines. All shafts in the gearbox are six splined. Gears are made of heat-treated, chrome-nickel-steel.

The machines are designed for the use of high-speed steel drills. There are three means provided for control of the feeds: Two manual and one automatic or power feed, the double-ended lever for rapid control, the small handwheel for accurate spotting, and the power lever for adjusting or changing the automatic feed.

The vertical motor drive is installed on the head. A gearbox contains three backgears. The mechanically controlled speeds are subdivided by the electric speed controller into either 11, 20, or 25 further steps per mechanical speed.

— 35 —

## Electric Controls for Radial Drills

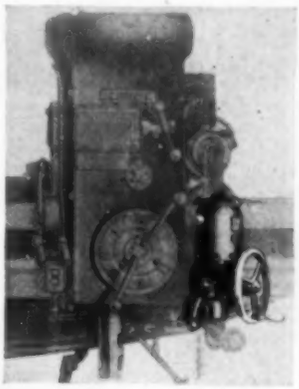
*American Tool Works Co., Cincinnati, Ohio.* [Vol.71,p.488]

Of the improvements on the triple-purpose radial drill, the first is an electrical speed control operated from the head. The control of the electrical speeds provided by the rheostat is accomplished through a star knob, which through a sprocket and chain connection, operates the speed adjusting mechanism of the rheostat. This entire speed control mechanism is mounted directly on the head.

Another improvement is the independent electrical power traverse unit shown. The unit is operated by a motor and switch mounted on the right-hand side of the head. A small control lever at the front operates the motor control switch and disconnects automatically the hand traverse mechanism before starting the electrical power traverse. The mechanism itself is guarded against accidental overtravel by limit stops at each extreme of the arm.

A further safeguard is provided by the operator having to hold the control level in engagement while traversing the head by power. The motor runs only when the head is being traversed by power.

Two other improvements have been made and adopted as standard features on the 19-in., 22-in.,



and 26-in. column sizes. The one of greater importance is the relocation of the feed control levers, which are now placed at the extreme lower left-hand corner of the head. The other improvement referred to is the unit control for the arm through the single level located on the cuff of the column sleeve.

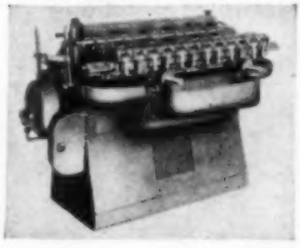
An improved electric column clamp is now available for all sizes. This clamp consists of a motor mounted on the column cuff and a forward and reverse push button on the head, which through a screw and bronze nut, operate the eccentric link for clamping and unclamping the column sleeve.

— 36 —

## Drilling Machine, Horizontal, Multiple-Spindle

*Kent Machine Co., Cuyahoga Falls, Ohio.* [Vol.71,p.223]

This multiple-spindle driller can be adapted not only to drilling several pieces during one cycle of the machine, but also is adaptable to drilling several holes in each piece. It is similar in design and operation to the standard No. 1, six-spindle, horizontal driller that has been



manufactured for some time, but is much larger and heavier in construction and contains many additional features. The driller is manufactured with six single spindles on 7½ in. centers, or a series of six units of specially designed cluster drillheads on the same center distances. The feed of the drill per revolution is controlled by a feed cam that may be varied in speed.

Twelve fixtures are required for the machine. While the drill table moves forward for the drilling operation, six fixtures hold the parts being drilled, while six other fixtures are being filled.

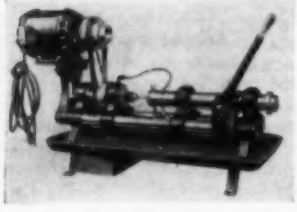
Either motor- or belt-drive is furnished. When motor drive is employed, the motor is located on a movable angle plate in the base.

## — 37 —

### Drilling Machine, Horizontal, Bench-Type

*Whirlwind Products Co., 1737 Ludlow St., Indianapolis, Ind.* [Vol.71,p.1024]

Adaptable to drilling small holes rapidly, and particularly to cross-drilling on a production basis, the bench-type horizontal drilling machine has New Departure double-row ball bearing at the front or chuck end of the spindle and a single-row type at the rear. The diameter of the spindle is 1½ in., and the speeds are 2,000, 4,000, 7,000, and



12,000 r.p.m. The ram has a diameter of 2 in. and a stroke of 2 in. An opening in the ram for a jig is 1 in. in diameter and the jig space available is 6 in. Drills from No. 60 to ¼ in. can be used.

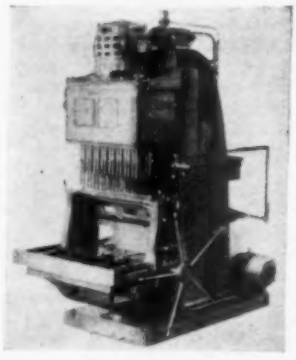
The machine is driven by ½-hp., 110- to 220-volt motor, which is equipped with a 10-ft. cord. The length of the machine is 36 in., the width, 15 in., and the height, 23 in. The weight uncrated is 250 pounds.

## — 38 —

### Drilling Machine, Special-Purpose, Multiple-Operation

*Defiance Machine Works, Defiance, Ohio.* [Vol.71,p.225]

The fixed-center head of this heavy, direct-motor-connected, Oilgear-feed machine can be made with any number of spindles to suit requirements in the drilling, reaming, counterboring, and spot facing of valve holes in cylinder blocks. All



spindles are made of heat-treated alloy steel, and are equipped with heat-treated helical gears and ball thrust bearings. The head is inclosed, and is supplied with forced-feed lubrication.

The machine is equipped with an adjustable table with screw jack supports. Extending in front of the machine, the table is fitted with rollers to connect with conveyor tables for passing the blocks from one machine to another.

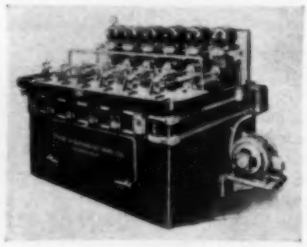
The column is a heavy cored casting. The approximate weight is 18,500 lb., and the floor space occupied is 108x64 in. The motor recommended for driving the head varies in size from 15 to 20 hp., with a speed of 1,200 r.p.m. A 2-hp. motor is required for driving the Oilgear-feed unit.

## — 39 —

### Drilling Machine, Special-Purpose, Deep-Hole, Six-Spindle

*Hammond Manufacturing Co., Cleveland, Ohio.* [Vol.71,p.504]

This machine is designed for drilling grease holes in shackle and king bolts. It is fitted with a self-contained motor-drive that includes a 5-hp. motor for the main drive and six ½-hp. motors for the drilling units. Suitable speeds are available for drills from ⅛ in. to ⅝ in. in diam-



eter. The machine will drill to 6 in. Standard equipment includes drill chucks, motors, and starting switches, lubricant pumps, an oil-pressure pump, and one set of fixtures. The machine is fitted with ball bearings.

The quick advance of the drill to the work, as well as the withdrawal, is controlled by a cam. The spindles advance to the work, drill, and withdraw from the work at the rate of 10 cycles per minute. An extra-large chip chute is provided.

Weight, 5,000 lb.; floor space, 5x6 feet.

## —40 —

### Drilling Machine, Special-Purpose, Multiple

*Thomas Spacing Machine Co., Pittsburgh, Pa.* [Vol.71,p.570]

The multiple drilling machine illustrated is one of a line of heavy-duty drills built for the purpose of drilling rivet holes in structural steel. The drill is mounted on a column in which counterweights are inclosed, and on which the drill head moves. A variable-speed motor is mounted vertically on top of the head. Directly between the

motor and the spindles is an inclosed gear chest consisting of 98 heat-treated and ground Westinghouse - Nuttall gears, supported on either side by a Hyatt roller bearing.

Oilgear feed gives a wide range of drilling speeds and provides a rapid traverse when approaching or withdrawing from the work. The maximum feeding pressure is high.

The standard roil-over table furnished with the drill embodies the latest improvements. The paper or drilling templet is a printed form that is marked to enable the operator to select the proper cluster of drills for each drilling. This marking is done in the templet shop.

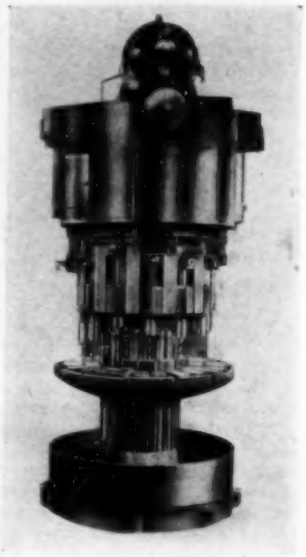
## — 41 —

### Drilling Machine, Special-Purpose, Continuous, Vertical, 12-Spindle

*Davis & Thompson Co., 57th Ave. and Mitchell St., Milwaukee, Wis.* [Vol.71,p.759]

Intended for drilling small parts such as overhead valve levers, pedals, and other automotive parts, this 12-spindle, vertical, continuous drilling machine has capacity for 1¼-in. holes in steel, from ½ to 6 in. in depth. If required, fewer spindles may be supplied.

Essentially, the machine consists of the rotating spindle carrier, table, and oil pan, and the stationary parts, which are the base, superstructure containing the driving means, and the strip cam, which is bolted to the lower edge of the upper casing. Above the base is a rotating



sleeve that has planed surfaces and T-slots for the attachment of the work tables. The maximum adjustment between the tables and the spindle noses is 30 in. The spindles are arranged on a 36-in. circle and they have 12-in. of adjustment. Spindle quills slide in a guide block. Roller bearings support the double ring gear that drives the spindles. Another large ring gear, bolted to the outside of the upper plate, furnishes space for lubricant.

Weight, 20,000 pounds.

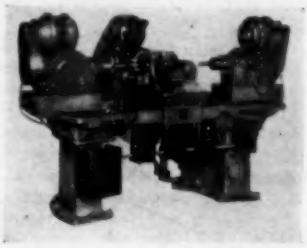
## — 42 —

### Drilling and Reaming Machine, Special-Purpose, Three-Head

*Bradford Machine Tool Co., 657 Evans St., Cincinnati, Ohio.* [Vol.71,p.904]

For drilling twelve $\frac{21}{64}$-in. holes through the flange of a malleable iron differential case, and also drilling and reaming two cross pin holes 0.8625 in. in diameter, the three-head drilling and reaming machine was recently furnished. The cutting speed is 80 ft. per min. and the floor-to-floor time is 60 sec. per piece.

The machine consists of two No. 2 Bradford single-spindle drilling units, each of which is



equipped with a 2-hp. motor, and the cams of these units are arranged to advance the spindle as follows: Rapid traverse, 3¾ in.; drilling feed, at 0.010 in. per revolution, 1¼ in.; reaming feed, at 0.018 in. per revolution, 1½ in.; and a rapid return of 6 in. The third unit is mounted at the back of the machine and is a standard No. 5 drillhead equipped with a 5-hp. motor and a 12-spindle auxiliary drilling attachment. The cam on this unit is arranged to give the following spindle action: Rapid traverse, 2¾ in. feed, at 0.010 in. per revolution, ¾ in.; and a rapid return of 3 inches.

The Bradford units are standardized equipment and each is fully automatic and self-contained. The motors are arranged to drive through a train of gears to the spindle and the spindle speeds may be varied to suit the requirements of each production job by changing the pick-off gears.

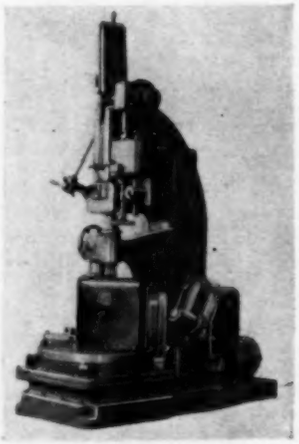
A push-button control is provided to stop and start the machine. This control is protected by a suitable magnetic switch. The feeding mechanism on all units is controlled through a simple poppet-type valve located at the left front of the machine.

— 43 —

## Drilling Machine, Special Purpose, Heavy-Duty, 36-Inch

*Defiance Machine Works, Defiance, Ohio.* [Vol.71,p.1019]

Designed for face milling the large bore of crank cases as well as for standard drilling, boring, reaming, and tapping, the special 36-in. table, heavy-duty drilling and boring machine has been developed. The machine has the head, feed, and speed boxes fully inclosed and a gravity or continuous-flow oiling system. A single pulley



drive is used, spindle speeds being obtained by means of two cones of hardened gears that run idle except when one set is meshed by a roll-in hardened gear operated by a convenient lever. The machine is made with a 36-in. revolving table, power feed being obtained by means of a worm drive from a 2-hp. 1,750-r.p.m. motor.

Helical gears are used to drive the spindle, and they are placed close to the nose. The machine, including the spindle drive, feed and speed, is driven by a 7½-hp. 1,200-r.p.m. motor.

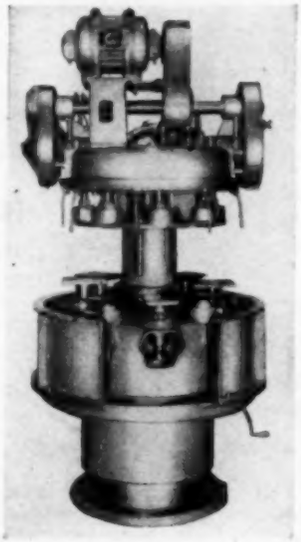
Specifications are: Diameter of the spindle, 3½ in.; length of power feed, 16 in.; diameter of spindle nose, 3½ in.; Morse taper in spindle, No. 5; center of spindle to face of column, 18 in.; maximum distance nose of spindle to top of table, 41 in.; floor space, 94x50 in., and net weight, 8,800 lb. The machine can be fitted with a plain table, compound table, or tapping attachment.

— 44 —

## Drilling Machine, Station-Type

*Enterprise Manufacturing Co., Third and Dauphin Sts., Philadelphia, Pa.* [Vol.71,p.221]

This is an all-purpose, continuous, rotary machine, suitable for drilling, tapping, spotfacing, counter-boring, and other operations in the production manufacture of precision-type automotive, radio, and electrical



parts. A battery of these machines may be set up for successive operations on the same piece.

The carrier containing the spindles and work tables rotates continuously around the column. There is a table for each spindle. During each revolution of the carrier, each table drops clear, and is again raised and fed to the drill. Spindles have no vertical motion. Cams can be mounted on the cam rail for indexing jigs and operating knockouts. The spindle speed is changed by changing a pair of spur gears. The speed of the carrier is changed by means of the change gears.

Capacity: Maximum depth of holes drilled with standard cam, 1¼ in.; maximum diameter of maximum diameter of hole drilled in 0.40 carbon steel, ⅜ in.; maximum facing diameter ⅞ in. deep in cast iron, 1¼ in.; maximum facing diameter ⅞ in. deep in steel, 1¼ in.; working torque permissible on spindle, 300-in. lb.; power required 5 to 15 horsepower.

Dimensions: Spindles, 1⅜ in. in diameter, No. 3 Morse taper; distance from spindle to top of table, when table is at highest point of cam, maximum, 16¾ in., minimum, 10 in.; distance from center of spindle to column, 6½ in.; distance from center to center of spindles in circle, 9 in.; floor space, 4 ft. x 4 ft.; weight, 5,000 pounds.

— 45 —

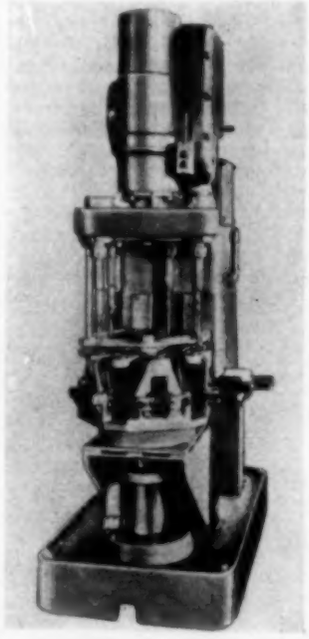
## Drilling Machine, High-Production

*Hoefer Manufacturing Co., Freeport, Ill.* [Vol.71,p.510]

This machine is made with either an indexing or a constantly-rotating worktable, as desired. The multiple-spindle head, bolted to the main head, carries tools for various operations. Any of the spindles can be made to reverse for tapping. Fixed depths of cuts are secured by the vertical adjustment of the spindles. Ball and roller bearings are used. The heads operate in an oil bath. Change gears give the speed variations desired.

The table may have screw, cam, or hydraulic feed. A Geneva movement is used on the indexing machine, with cam or screw feed. On the continuously rotating machine, the table has no vertical movement.

A four-sided central column carries four slides on which are mounted four single-spindle units. The upper ends of these



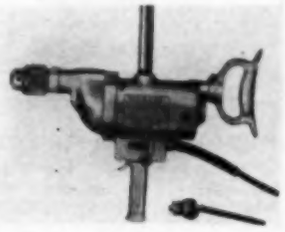
units contact with cams which give the feed required. One-fourth of the rotation is used for loading and unloading.

— 46 —

## Drill, Electric, ⅝-Inch

*Wodack Electrical Tool Corporation, 4627 W. Huron St., Chicago, Ill.* [Vol.71,p.303]

Capacity to drill up to ⅝ in. in steel and up to 2 in. in wood is furnished in this drill powered with a G.E. motor, which may be obtained for either d.c. or



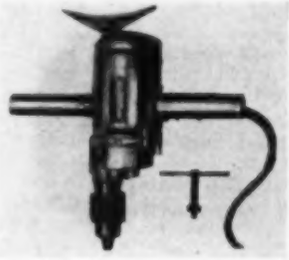
a.c. circuits of 60 cycles or less of 110 to 125 or 220 to 250 volts. Timken roller bearings take thrust loads and ball bearings are used in other positions. Hardened gears constitute a feature. Ventilation is provided by means of an over-sized fan. The tool can be held vertically in a quick-acting slide actuated by a hand lever. The mechanism can be raised or lowered on the column. A grease compartment is furnished to supply lubricant for long periods without refilling.

— 47 —

## Drill, Electric, ½-Inch, Type 59

*Speedway Manufacturing Co., 5 Great Jones St., New York, N. Y.* [Vol.71,p.798]

Capacity to drill ½-in. holes in steel at 350 r.p.m. is embodied in the Type 59 drill. The gear case has been so built that by a simple change of gears the tool may be provided with a varying range of speeds. A maximum speed reduction of 26 to 1 is possible. Equipment includes: Breast plate, 3-jaw Jacobs key-type chuck, extra side handle,



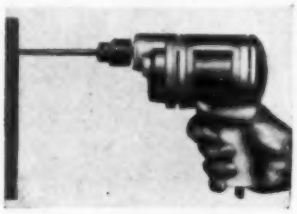
8-ft. rubber-covered cord with a soft rubber split plug connection, and a heavy-duty type, switch. The drill is available for use on 32-, 110- and 220-volt, a.c. or d.c. circuits. The weight is 14 pounds.

— 48 —

### Drill, Electric, ¼-Inch, No. 000 U

*James Clark, Jr., Electric Co., 600 Berman St., Louisville, Ky.* [Vol.71,p.875]

This ¼-in. drill, which is suitable for work in close quarters, is only 7½ in. in length. It has a no-load speed of 2,000 r.p.m.



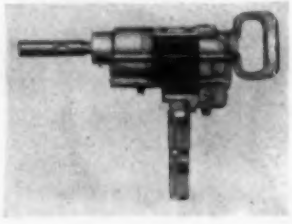
and a loaded speed of 1,200 r.p.m. Ball bearings are used throughout. The drill can not be stalled even when a 200-lb. man is operating it. Weight, 4½ pounds.

— 49 —

### Drills, Pneumatic, Production, Types E-4-C and E-40-C

*Rotor Air Tool Co., Cleveland, Ohio.* [Vol.71,p.496]

These drills in ½-, ¾-, ⅞-, and 1-in. sizes are compound-geared for production drilling, reaming, stud setting, and nut setting. Extra-heavy ball bearings are provided. The quick-acting



governor prevents motor racing.

Drills are furnished with a side-handle and with the usual optional equipment of breast-plate, spade handle, eyebolt, and similar parts. The E-40-C differs from the E-4-C in having more power. Speeds ranging from 200 to 600 r.p.m. are provided, covering drilling from 1 to ½ in., reaming from ⅛ to ⅝ in., and tapping, ¾ to ⅝ in. The E-4-C weighs 16 lb., and the E-40-C, 17 pounds.

— 50 —

### Drill, Pneumatic, High-Production, Type E-O

*Rotor Air Tool Co., Cleveland, Ohio.* [Vol.71,p.515]

The "High-Production" E-O drill, in capacities of ¼, ⅜ and ½ in., for high-speed production work, is exceptionally light, weighing less than 4 lb. in all models. Three speeds are provided, 1,000, 1,500, and 2,000 r.p.m. All models are furnished with a grip throttle and a Jacobs chuck.

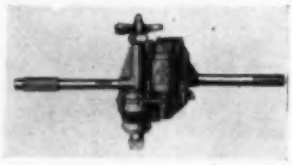
— 51 —

### Drill, Pneumatic, Rotary, No. 275, "Thor"

*Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill.* [Vol.71,p.755]

A drilling capacity of 1½ in. and a reaming capacity of 1¾ in. are found in the "Thor" Model 275 drill. The free speed is 350 r.p.m. and the weight is 35 pounds.

The machine may be oper-



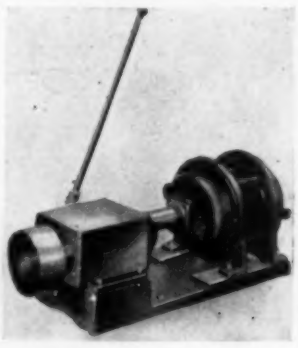
ated by one man. A feature is that it carries a 50-lb. load at the same speed that it runs free. It also carries a 100-lb. load at a reduction in speed of only 30 per cent. The unit does not race, but idles along, consuming only a few cubic feet of air. The construction permits operation in close quarters on the side without removing the dead handle.

— 52 —

### Speed Box, Timkenized, Garvin

*Western Machine Tool Works, Holland, Mich.* [Vol.71,p.302]

To obtain greater production and range on the No. 1 automatic tapping machine, the Garvin Timkenized speedbox has been redesigned. Features are as follows: Three selective speeds, chrome-nickel steel gear, greater production, no belt shifting to change speeds, and increased work range of the machine driven. The unit may



be obtained for direct-connected motor drive, or for single pulley drive.

With a 12-in. driven pulley the speeds are 300, 400, and 600 r.p.m., and with an 8-in. driven pulley they are 450, 600, and 900 r.p.m. The motor-driven type requires a 1-hp. motor running at 1,200 rev. per minute.

— 53 —

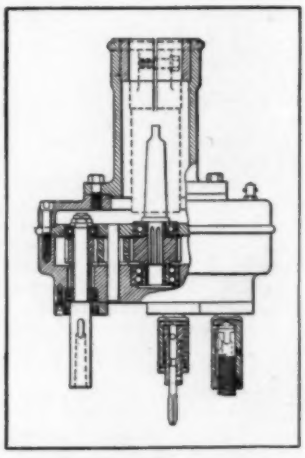
### Drillhead, Multiple-Spindle

*Gray Hub Co., 3171 Bellevue Ave., Detroit, Mich.* [Vol.71, p.836]

A multiple-spindle drillhead has been placed on the market. The holding sleeve is flanged similar to a flange quill of a standard drill press, permitting the head to be changed from ordinary drill press to a flanged-quill type without alterations, and so constructed that the head may be placed in any position on the quill of the drill press. The clamp bushing is bored to fit any size drill press and is changeable should the head be transferred to another machine.

A chrome-nickel steel drive spindle is used, and this is hardened and driven by means of splines. It is used with either a Morse taper or flanged-quill type of drill press. The cover has a machined pad and a standard size dowel hole to adapt the head to either type of machine. Aluminum castings are used for the body and the cover, but an iron casting may be substituted where weight is optional and strength is required. The center plate is constructed so that rings may be added between it and the cover.

A tapping spindle may be



mounted the same as the drill spindle, and the holder allows the tap to cut freely. A broached, square hole drives the tap. An adjustable spindle having a sleeve with square threads for fine adjustments can be quickly set to depth by means of a knurled nut for counterboring, spotfacing, and drilling blind holes. Standard Alemite lubrication is furnished.

## *Gear Cutting and Testing Machines*

— 54 —

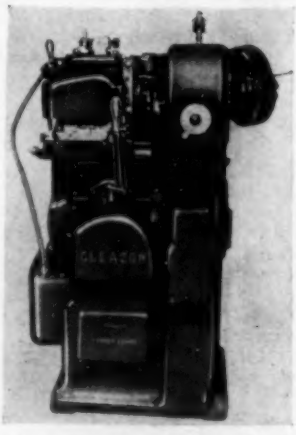
### Gear Generator, Spiral-Bevel, 3-Inch

*Gleason Works, Rochester, N. Y.* [Vol.71,p.505]

This small-size spiral bevel gear generator cuts gears of 3⅜ in.-pitch diam., ½ in. face, and 1¾ in. cone distance at a 4 to 1 ratio. The largest pitch angle which can be cut for gears mounted at right angles is 75 deg. 58 min., and the smallest 14 deg. 2 min. This machine employs the familiar generating principle of other Gleason bevel gear generators.

The work segments are adjustable so that each segment can cover a small range in pitch angles from about 1 deg. on pinion segments to 7 deg. on the largest gear segments.

Cutters used are of the face-mill type with the blades integral with the head. The cutter spindle is adjustable both vertically and horizontally. An angular adjustment in a vertical plane is also provided. One of the improvements is the quick



throw-out mechanism that enables the cutter slide to be moved instantaneously to or from the cutting position for loading.

The machine is driven by two ½-hp. motors. A set of 33 feed and speed gears is furnished. Feeds obtainable are from 1 to 30 sec. per tooth. Cutter speeds vary from 75 to 250 ft. per minute.

The cutter spindle is mounted

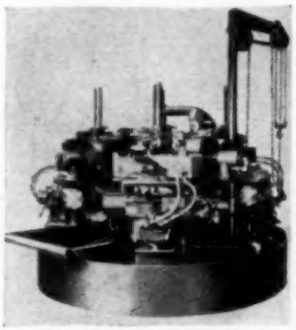
on special ball bearings. A manually operated brake on the cutter motor driveshaft permits quick stopping of the cutter spindle and also holds it against rotation while changing cutters.

— 55 —

## Gear Rougher, Manufacturing, Four-Spindle

*Gleason Works, Rochester, N. Y.* [Vol.71,p.717]

This machine was designed and built for rough-cutting straight bevel gears in large quantities. It was designed primarily for gears of the differentials of automobiles or other gears not exceeding 4½-in. outside diameter and is completely automatic in operation, including loading and unloading. The gears fall down chutes at each station to pans.



The entire machine, with the exception of the cutter drive, is hydraulically operated. Four blanks can be cut simultaneously. Work heads are entirely independent of each other, so that any or all of the four heads can be in operation at one time. In many cases, several different gears or pinions may be roughed satisfactorily at one time.

Specifications: Capacity — Largest pitch 3 d.p.; diameter of cutter head, 20.8 in.; largest pitch diameter cut, 4 in.; greatest pitch angle, 65 deg.; smallest pitch angle, 25 deg.; minimum and maximum number of teeth to be cut 6 to 30. Work spindle—Diameter taper hole, large end, 1.796 in.; taper per foot, 0.500 in.; diameter of hole through, 1¼ in. Speeds and feeds—Speed of cutter head, 21.2 to 95.5 r.p.m.; speed of cutter head, f.p.m. 50 to 520; horse power of motor, 10; floor space 85x103 in.; net weight, 12,000 pounds.

— 56 —

## Gear Generator, Straight-Bevel, 3-Inch

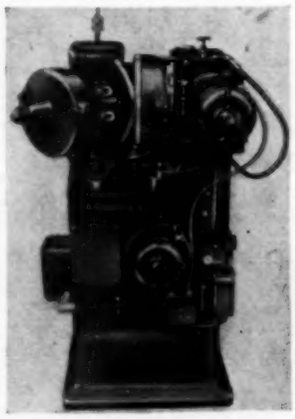
*Gleason Works, Rochester, N. Y.* [Vol.71,p.757]

Straight bevel gears, up to 4½-in. pitch diameter, 2¼-in. cone distance, and 10 d.p., can be cut on this bevel gear generator, intended for either large or small production. It will rough and finish in either one or two operations, depending upon the pitch and quality of work desired.

The generating principle used in this machine is the same as used in previous bevel gear generators made by the company. The tooth shape is developed by rolling the teeth between reciprocating tools which represent adjacent sides of a tooth in an imaginary crown gear.

One of the improvements on this machine is the quick throwout mechanism, which enables the operator to move the toolhead into or away from the cutting position by a lever. The work segments are adjustable so that each segment can cover a range in pitch angle from 1 deg., on small pinions segments, to 7 deg., on the largest segment. The tools used are identical with those used on the larger machines.

Specifications: Longest cone distance, 2¼ in.; maximum and minimum pitch angles, shafts at 90 deg., 75 deg. 58 min., and 14 deg. 2 min.; extreme ratio, 4 to 1; minimum teeth in miter gears, 16; maximum pitch diameter, 4 to 1 ratio, 4 7/16 in.; 2 to 1 ratio, 4 in.; one to one ratio, 3 1/16 in.; longest face, ⅞ in.; range in number of teeth, 10 to 80; speed of cutters, 200 to 800 strokes per min.; drive, ¼ and ½ hp.; floor space, 27x31 in.; net weight 1,500 pounds.

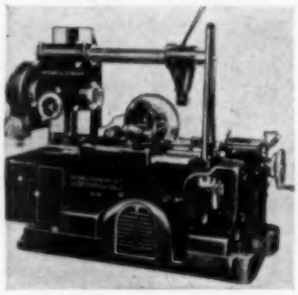


— 57 —

## Hobbing Machine, Gear, No. 34

*Brown & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.379]

The redesign of the No. 34 gear-hobbing machine has made it of the motor-in-base type, equipped with an oil filter. For convenience, the oiling arrangement has been simplified; and the cutter coolant pump has been relocated. Anti-friction bearings are used. The machine can also be driven from the overhead works and when so driven, a 4-in. belt running at a constant speed of 500 r.p.m. is used.



The cutter coolant pump, located at the rear of the feed case, is readily accessible. It is driven by a chain from the driving pulley shaft and can be disconnected easily when cutting cast iron.

— 58 —

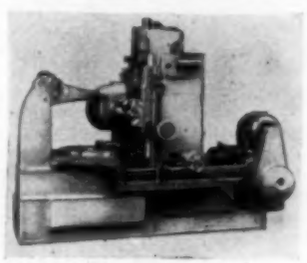
## Hobbing Machines, Gear, Nos. 48-HS and 48-HL

*Gould & Eberhardt, Newark, N. J.* [Vol.71,p.503]

The heavy 48-HS and 48-HL machines are adapted for roughing and finishing large diameters and medium pitch spur gears, limited-angle helical gears, and sprockets and worm wheels used in tractors, railway cars, trucks, printing presses, and mining and hoisting equipment. Rated for 2 D.P. in steel, the machines have a capacity up to 32 in. in diameter with the arbor support and 57 in. in diameter with support removed. The weight of the machines is approximately 14,000 lb. each.

The cutter and work drives of the 48-HS and 48-HL are balanced, eight gears in each train terminating in a worm and wormwheel. Power rapid transverse at 50 in. per min. moves the cutter rapidly in either direction. The feed motion automatically disengages the main clutch and stops the machine but leaves the power traverse available.

Adjustable stops govern the movement of feed and traverse, and fixed safety stops control the extreme limits of motion. The cutter slide is mounted on a rigid box section stanchion adjustable along the bed for the depth of tooth and diameter of gear to be cut. A 10-deg. angular adjustment of the cutter slide is provided for single-, double-, or triple-thread hobs.



The work table is located in a large tapered bearing directly within the base casting. The work arbor support is of a box type with an adjustable arm that can be locked in any position.

The machine is equipped with a single constant-speed driving pulley mounted on anti-friction bearings. Power is transmitted through a plate-type clutch arranged with a single adjustment. All operating controls are conveniently located. A constant-speed motor of 10 to 15 hp., 1,200 r.p.m., either a.c. or d.c., can be used.

The traverse and feed controls are interlocked.

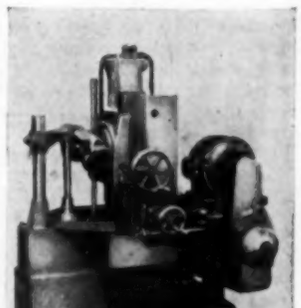
— 59 —

## Hobbing Machine, Gear, Universal, No. 9-H

*Gould & Eberhardt, Newark, N. J.* [Vol.71,p.503]

The 9-H small high-speed universal gear hobbing machine, is particularly adapted for generating spur, helical, herringbone, and worm gears. The machine can cut gears up to 9 in. in diameter with the average support, and 12 in. in diameter with the support removed, and is rated for 10 D.P. in steel. The weight is approximately 2,800 pounds.

The vertical cutting principle is embodied in the machine, and the cutter slide is mounted on reetangular guides of the rigid box section stanchion, which is adjustable for depth and diameter of gears to be cut. The cutter slide can be swiveled through an angle of 180 deg. for cutting either right- or left-hand helical gears of any angle. The cutter arbor is portable to permit using arbors or different diameters, and particularly to accommodate small-diameter, solid-shank hobs.



The machine is equipped with a single constant-speed driving pulley mounted on anti-friction bearings. The power is transmitted through a multiple plate-type clutch.

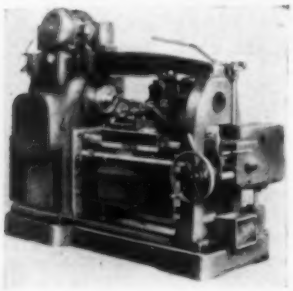
The motor application is a direct-connected drive and can be made with either belt or silent chain. A constant speed motor of 3 hp., 1,200 r.p.m., either a.c. or d.c. can be used.

— 60 —

## Hobbing Machine, Production, Type B

*Barber-Colman Co., Rockford, Ill.* [Vol.71,p.869]

Designed as a manufacturing machine for roughing and finishing spur gears, spline shafts, and similar forms, this gear hobber is being introduced. Principal features are: Work-diameter control by means of an elevating bed; work spindle mounted in a housing fast to the base; centralized interlocking controls; direct-connected motor drive; a unit pressure-



oiling system; Timken precision roller bearings on hob and work spindles; roller and ball bearings on other parts; worm and worm gear final drive to the hob; a hob-spindle drive outside the bed, allowing the hob to swivel on a center under the work; automatic continuous lubrication of the feedbox; a hob-slide power rapid traverse; hardened spiral bevel gears throughout; and a screw and micrometer dial for positioning the hob.

Specifications: Capacity, diametral pitch, cast iron, 3; capacity diametral pitch, steel, 4; center distance between work spindle and hob, minimum, 2 in.; center distance between work spindle and hob, maximum, 8 in.; maximum travel of hob carriage, 16 in.; feeds, 0.081 to 10.720 in. per min.; hob speeds 55.1 to 159.4 r.p.m.; number of changes of hob speed, 8; motor, 7½ hp., sneed, 1,750; floor space, 42 by 92½ inches.

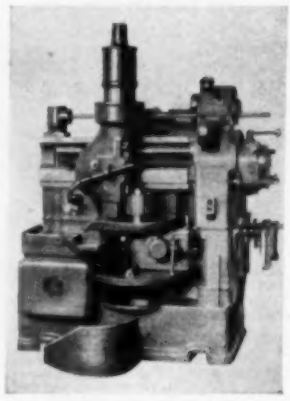
The bed on which the hob carriage travels is supported on two elevating screws with elevating bevel pinions and gears, geared to the operating handwheel. Graduations provide for setting the height of the bed to 0.0005 in. The entire arrangement is claimed to provide for parallelism of work.

— 61 —

## Gear Shaper, Improved, No. 6A

*Fellows Gear Shaper Co., Springfield, Vt.* [Vol.71,p.949]

Several improvements from the operating standpoint have been made in the type 6A gear shaper. One of the principal improvements is the introduc-



tion of a friction disk clutch and a single pulley drive. These are completely inclosed. Incorporated with this single pulley drive is a disk brake. The capacity of the machine remains the same, 18-in. pitch diam., both internal and external; 5-in. face external and 3-in. face internal; and ¾ diametral pitch.

Another convenience is an opening so that the entire compound tank can be cleaned out. A motor bracket of more simple design has been added to the machine.

— 62 —

## Burnisher, Gear

*Cincinnati Shaper Co., Cincinnati, Ohio.* [Vol.71,p.480]

This burnisher handles gears up to 12 in. in diam. and may be arranged to take larger gears. One feature is the method of counter-weighting. The pressure with which the burnishing

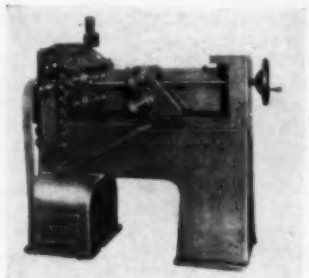
gears engage the green gear is fixed by means of counterweights that permit a movement of the carriage slide sufficient to compensate for any small variation in the pitch diameter of a run of gears.

— 63 —

## Lapping Machine, Gear

*Lehmann Machine Co., St. Louis, Mo.* [Vol.71,p.758]

Easy set-up to lap gears of 14 in. in diameter or less is found in the gear-lapping machine adapted to lapping hardened gears. It consists of two spindles, upon the outer ends of which the mating gears to be lapped are secured. These spindles carry hardened friction rolls of pitch diameter of the gears being lapped, and are driven by contact with rolls. The pressure on the disks is carried by eight large ball bearings in which the friction rolls



are journaled. Oil and abrasive are fed on the gears being lapped.

No change in pitch diameters occurs. Gears with hunting teeth compromise with the restraining movement of the disks. One operator can take care of the running of several machines.

Specifications: Largest gear lapped, 14 in. diameter; size of motor, 3 hp.; weight, 2,750 pounds.

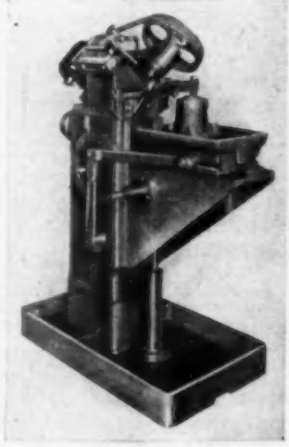
— 64 —

## Rounder, Gear Tooth

*Cross Gear & Engine Co., Detroit, Mich.* [Vol.71,p.720]

This gear tooth rounder consists of a cutter head and spindle mounted on a 45-deg. head, and actuated by a feed cam located in the column of machine. The cam action is transferred to the cutter spindle through a rack and pinion.

The cutter spindle is mounted on ball bearings, and two types



of cutters can be used. The cutter is driven by an electric motor on the rear of the machine, the feed being through a worm gear and clutch. Indexing is done from the already formed tooth and the gear is held rigidly right at the point of the cut during the cutting operation. Provisions are made for adjusting the cutter in relation to the work and the work in relation to the sector.

The productive speed of the gear tooth rounder is 50 teeth per min. on standard types of auto-starter gears, and it has capacity for 2-in. pitch diameter gears to 36-in. pitch diameter gears of 6 D.P. The machine is constructed to minimize vibration.

— 65 —

## Testing Device, Gear-Cutter

*Gleason Works, Rochester, N. Y.* [Vol.71,p.477]

This testing device is used as a comparator to insure that the blades in the circular cutters used on Gleason spiral bevel and hypoid gear cutting machines are so mounted as to have absolutely identical cutting pressure angles. The blades are now being sold separately from the cutter heads and it is essential that they be carefully checked after being assembled in the head. Any corrective work necessary to locate the blade accurately can be done on this fixture without removing the cutter.

The device includes an indicator reading in 0.0001 in., a cutter head carrier against

which the cutter is held by spring pressure, and a gibbed dove-tail slide on which the carrier is angularly adjustable, and which is slidable on the base of the fixture, so that the blades in the cutter can be moved back and forth under the indicator finger.

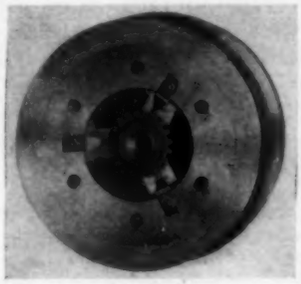
The indicator holder is vertically and horizontally adjustable on the base so it can be used for checking both inside and outside blades. The cutter head carrier has a wide range of angular adjustment for covering the full range of pressure angles. The tester is built in two sizes, one for 9-in. and the other for 12-in. cutters. Both are of sturdy construction.

— 66 —

### Chuck, Gear-Grinding, Bolender

*City Machine & Tool Works, 1517 East Third St., Dayton, Ohio.* [Vol.71,p.908]

Concentricity of the bore and the pitch line of the teeth may be obtained when grinding gear bores in the Bolender chuck. It is available for either power or hand operation in two sizes, as follows: The No. 1 accepts 20 tooth 6-8 pitch gears and smaller, whereas the No. 2 accepts 31 tooth, 6-8 pitch to 20 tooth, 6-8 pitch gears. Special chucks are manufactured to customers' specifications.



The Bolender chuck is completely lubricated through one Zerk oiler. Work is loaded from the front without adapters. Through the use of quick-change special chuck jaws, all types of irregular work can be handled.

## *Grinding Machines*

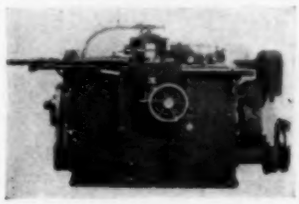
— 67 —

### Grinder, Cylindrical, Automatic, No. 132

*Arter Grinding Machine Co., Worcester, Mass.* [Vol.71,p.493]

Improvements in this machine are as follows: The wheel slide has been lengthened; the handwheel through which compensation is made for wheel wear has been increased in diameter and provided with means for making adjustments to 0.001 in.; Texrope belts are used to drive the wheel spindle, and the wheel spindle bearing construction has been modified.

The wheel-dressing attachment is operated by a motor



mounted on the machine. A grinder is provided for grinding the work centers while in position.

This machine is used to grind automatically, by the straight-in feed method, work that can be held on centering devices. A turret is provided to convey the work to the centers. The number of holes in the turret for carrying the work are as numerous as the size of the work will permit. Work may be loaded into the turret by hand or automatically.

Continuous-feed lubrication is provided by a positive pump of the submerged, centrifugal type. The machine is designed for indirect motor-drive by belt, or by direct motor-drive through a flexible coupling.

Specifications are: Work capacity, diameter, 5 in., length one grind, 5½ in.; maximum distance between centers, 16 in.; grinding wheel, 18-in. diam., 12-in. hole, width, as necessary for work; floor space, 90 x 70 in.; net weight, 5,800 lb., motor specifications, 10-25 hp., according to work.

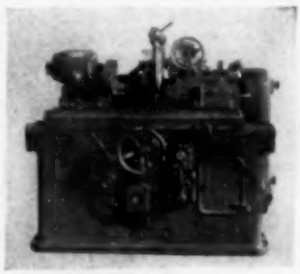
— 68 —

### Grinder, Cylindrical, Plain, Hydraulic, Type C, 6-Inch

*Landis Tool Co., Waynesboro, Pa.* [Vol.71,p.512]

A high-production grinder for axle and stub shafts, small motor armatures and armature shafts, bearings, twist drills, and other similar small parts has, as a distinctive feature, hydraulic work-carriage traverse with quickly available traversing speeds ranging from 12 to 360 in. per min. A 24-in. grinding wheel is used, driven through multiple V-belts.

Both electric motors are attached to the machine, and the water tank is integral with the bed. Bearings for the alloy-steel spindle are steel backed, babbitted, and are adjustable for wear. Continuous spindle



bearing lubrication is provided.

The traversing oil pump is of the low-pressure geared type. All parts run in oil, and anti-friction bearings are used. The traversing oil motor is of the four-impulse, two-chamber, continuous type.

The grinding wheel cross feed is either automatic or hand operated. Hydraulic pressure actuates the automatic feed. The headstock is driven by an individual variable-speed motor. Plain bearings, adjustable for wear, are used in the faceplate. Provision has been made for mounting and driving a d.c. generator at the rear of the machine when d.c. current is not available. The main drive motor is mounted on the rear of the bed. Hydraulic straight infeed to the wheel head and a reciprocating wheel spindle may be supplied for plunge cut grinding.

— 69 —

### Grinder, Cylindrical, Hydraulic Table Traverse, Type BA, 10x50-Inch

*Norton Co., Worcester, Mass.* [Vol.71,p.516]

The type BA cylinder grinding machine has been improved by the use of a hydraulic table traverse, which provides a greater range and an infinite

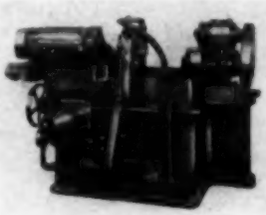
number of changes of table speed. It is smooth in operation and quiet at reversal. The former design of the wheel spindle is retained.

— 70 —

### Grinder, Cylindrical, Type A, 10-Inch

*Norton Co., Worcester, Mass.* [Vol.71,p.531]

Few changes have been made in the front of this machine, for the hydraulic mechanism introduced is at the rear near the wheel slide, although it is operated by a lever at the front. This mechanism is designed to



minimize the handfeed required and so speed up production. Rapid motion from the extreme rear position to a point near the grinding position is secured by moving a conveniently located control lever. Actual grinding is by handfeed, but the control lever returns the wheel slide to the original position upon completion of the operation.

— 71 —

### Grinding Machine, Face, Hydraulic

*Diamond Machine Co., Providence, R. I.* [Vol.71,p.1058]

Hydraulic drive is featured. All controls are centralized at the operator's position. Specifications herein described cover the 30- and 36-in. machines only. Other capacities can be furnished upon request.

The size of the table is 24 by 200 in. in over-all length, the platen measuring 24x86 in. and having five T-slots for ¾-in.

bolts on 4¾-in. centers. Drive is by means of a low-pressure hydraulic cylinder and a piston. The 30-in. machine will take work 20 in. high by 84 in. long, whereas the 36-in. grinder will take work 24 in. high by 84 in. long. Extra-length tables can be furnished.

A "Diamond," patented, segmental-type, wheel is used. More than 6 in. of depth adjustment for wheel wear can be obtained. Wheel feed is obtained either by hand or automatically for a total of 2¾ in. Power is furnished to the wheel by means of a 40-hp., 1,200-r.p.m. motor.

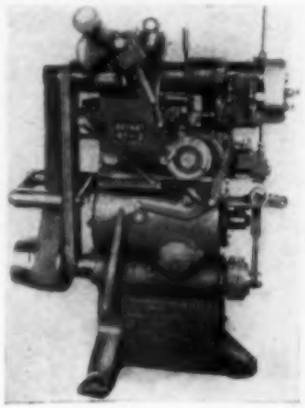
Floor space requirements are as follows: 7 ft. 6 in., front to back; 26 ft. 6 in., end to end. The weight for the 30-in. machine, without motor, is 15,500 lb.; for the 36-in. machine, without motor, 17,000 pounds.

— 72 —

### Grinder, Internal, Deep-Hole, No. 24

*Bryant Chucking Grinder Co., Springfield, Vt.* [Vol.71,p.489]

For internal grinding of long, large holes, such as airplane engine cylinder bores, this machine is offered in three sizes for 21-, 31-, and 41-in. swings, respectively. It has a 14-in.



grinding stroke. The weights of the different sizes ranges from 7,000 to 8,000 pounds.

The work spindle is 5¼ in. in diameter and is carried in Timken roller bearings spaced 3 ft. apart. The overall length of the machine is 11½ ft., and the overall width, 4 feet.

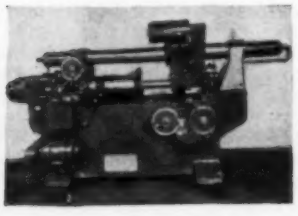
This machine holds to the same fundamental design used in other Bryant grinders with single-slide and hydraulic control, but is of considerably larger size. Automatic sizing features also are retained. The wheelhead is driven by a 10-hp. 3,600 r.p.m. motor through a 6-in. belt. A 5-hp. motor, mounted below the work spindle, drives the work spindle at a speed of 100 to 200 r.p.m., and also drives the hydraulic pump, water pump, and other parts of the machine. Ball or roller bearings are used on the work-wheel shaft and all other shafts. A 300-gal. coolant tank is provided.

## — 73 —

### Grinder, Hole, Heavy-Duty, No. 3

*Bryant Chucking Grinder Co., Springfield, Vt.* [Vol.71,p.519]

A heavy-duty model of the No. 3 semi-automatic hole grinder has been developed to supplement the No. 3 standard machine. The heavier machine



grinds holes up to 2 in. in diameter, but the stroke and swing remain unchanged. A heavier slide-bar, larger drive-shaft, wider belts, and larger motor equipped with Texrope drive are employed.

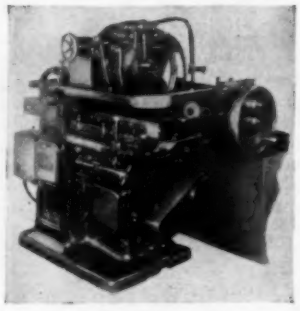
## — 74 —

### Grinder, Internal, High-Speed, No. 12

*Greenfield Tap & Die Corporation, Greenfield, Mass.* [Vol.71,p.529]

This No. 12 high-speed internal grinder is open-ended, the grinding wheel entering the work from the rear. It is hydraulically-driven, even the valve mechanism and controls being hydraulic in action. The wheelhead is stationary so that it is possible to use a single motor.

The machine swings 15 in., and grinds holes from ¾ to 3½ in. in diameter by 4 in. deep. The worktable is 17¾x54 in.; cross-slide, 16x41 in.; work-spindle hole 8¾ in.; spindle speeds, 214, 383, and 572 r.p.m.,



but change gears give other speeds. Hydraulic worktable feed is from 0 to 30 ft. per min. Individual oilers, oil wells and Alemite connections provide lubrication. Either self-contained, single-belt drive or direct-connected motor-drive are provided, a 7½-hp., 1,800 r.p.m. motor being standard.

Weight, 5,500 pounds.

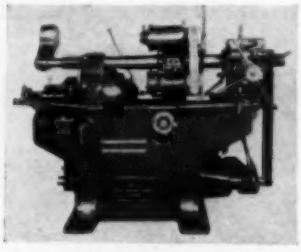
## — 75 —

### Grinder, Hole, Semi-Automatic, No. 12

*Bryant Chucking Grinder Co., Springfield, Vermont.* [Vol.71, p.722]

Having a maximum grinding length of 9 in. and a total chuck swing of 16 in., the No. 12 hole grinder has been placed on the market. An 11-in. maximum stroke is provided. The model illustrated is the No. 12A which in addition to grinding the hole also grinds the face of the work.

The machine is entirely self-contained. The wheel spindle is driven by a single belt from the



3,600 r.p.m., 7½-hp. motor mounted directly on the wheel slide, an idler being provided to give maximum belt contact and ample adjustment. A second motor, a 1,200 r.p.m., 2-hp. size, is mounted on the back of the machine and drives the main drive shaft, from which power is taken for the work spindle, longitudinal traverse, power feed, and pump. The work is driven from a cone pulley at the left end of the main shaft. Two work speeds, 200 and 400 r.p.m. are available, the change being made easily.

Specifications: Total chuck swing 16 in.; maximum wheel-slide traverse, 11 in.; maximum grinding length, 9 in.; wheel slide travel per revolution of work, $\frac{1}{16}$ to $\frac{1}{2}$ in.; floor space required 3½x7½ ft.; net weight of machine with motors, 2,950 pounds.

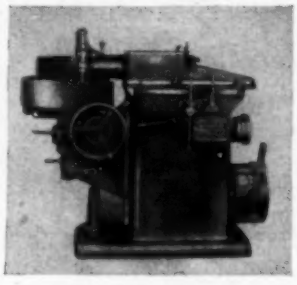
## — 76 —

### Grinder, Surface, Improved, Rotary, 12-Inch

*Arter Grinding Machine Co., Worcester, Mass.* [Vol.71,p. 492]

Numerous improvements in design and operation are embodied in the 12-in. rotary surface-grinding machine. An improved brake has been adopted for the chuck spindle. Ball-bearings are now used in the main shaft, the main-spindle belt idler, and in the loose pulleys. The size of the coolant tank has been increased.

The magnetic chuck diameter



has been increased from 12 to 14½ in., its top-plate can be replaced when worn, and only a single coil is used for energizing purposes. Three work feeds are provided, with three wheel feeds for each one. The chuck sliding bracket is raised or lowered by a handwheel. Wheel feeds are both hand and automatic. Stroke adjustment is made by means of sliding dogs on the wheel-rack slide.

When the grinder is arranged for motor drive, the motor is mounted on a base at the rear. Drive is through a 3-in. chain to a sprocket on the ball-bearing countershaft.

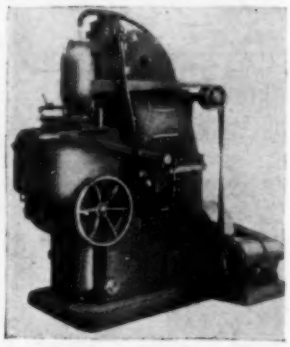
Specifications: Diameter magnetic chuck, 12½ in.; largest diameter clear grind, 14½ in.; swing inside water pan, 16½ in.; swing without water pan, 24 in.; distance between work table and wheel with full diameter wheel, 11 in.; tilt of worktable, either direction, 12 deg.; size grinding wheel, 5-in.; hole, 12x1 in.; weight, 2,800 lb.; floor space occupied, 61x41 inches.

## — 77 —

### Grinder, Surface, Single-Stroke, Model D

*O. S. Walker Co., Inc., Worcester, Mass.* [Vol.71,p. 514]

While generally similar in appearance to previous models, the Model D single-stroke grinding machine differs in several particulars. Fitting of the driving motor to the machine has been simplified by a change in the type of base. Another change is the provision of means



for tilting the table that carries the chuck bracket. The ability to adjust the wheelhead carrying member makes it possible to grind hubs of cutters and saws up to 6 in. in diameter.

A 7½-hp. motor is required, and the weight of the complete machine has been increased to 5,000 lb. Other specifications are the same as for previous models.

## — 78 —

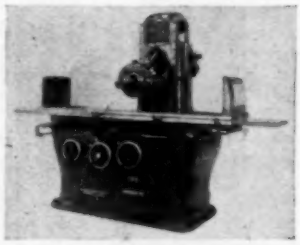
### Grinder, Surface, No. 5

*Abrasive Machine Tool Co., East Providence, R. I.* [Vol.71, p.530]

This No. 5 surface grinding machine, having longitudinal table travel of 48 or 60 in. and an automatic transverse table travel of 14 in., uses grinding wheels up to 14 in. in diameter by 1½ in. thick, and 5-in. hole. The work surface of the table may be either 14x48 in. or 14x 60 inches.

The head is actuated by means of a screw operated through a worm and gear. Power feed is provided, operating at 9 in. per minute up or down, and equipped with adjustable stops, also safety stops. The spindle operates at 1,500 rev. per minute.

The table feed, reversing gear mechanism, and power vertical feed are all combined in one transmission case. The longi-



tudinal table travel is automatic in either direction. Speed of the table is 25 ft. per minute. A hydraulic shock absorber eliminates vibration at the point of table reversal.

The transverse travel of the table is automatic in either direction and the dogs can be adjusted to feed at each reversal of the table or alternate reversals as desired. The range is from $\frac{1}{64}$ to $\frac{1}{16}$ in. The machine

may be equipped for countershaft or motor drive. A 5-hp. motor is required, running at 1,150 or 1,450 r.p.m. The dimensions are, transversely, 76 in., and, longitudinally, 188 in. for the 48-in. machine, and 199 in. for the 60-in. machine. Extra equipment includes an exhauster for dry grinding and a wet-grinding attachment.

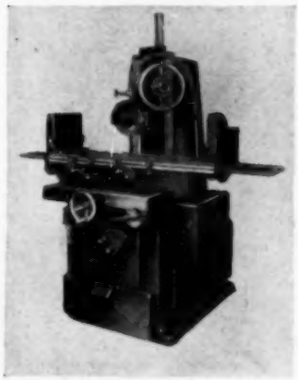
— 79 —

## Grinder, Surface, No. 3

*Gallmeyer & Livingston Co., Grand Rapids, Mich.* [Vol.71, p.721]

The No. 3 surface grinder has an automatic table travel of 26 in. longitudinally and 9 in. transversely. The working surface of the table is 8x24 in., and the vertical movement of the wheelhead is 11 in. From the table to the circumference of an 8-in. diam. wheel, the distance is 10 inches.

A Brown & Sharpe oil pump furnishes the hydraulic power



for the longitudinal feed. A control lever regulates the valve on the hydraulic feed and varies the feed from 55 down to 5 ft. per minute.

A small lever, operated by stops set at the required points on the table, regulates the travel and reverse of the table in a longitudinal direction.

The mechanical cross feed operates through a worm-and-gear drive with internal and external ratchets. Feeds are from 0.004 in. to ⅛ in. Adjustment is made on the lever mechanism shown below the table.

The grinder is driven by a 5-hp. motor driving a belt held in tension by an idler jack. An automatic control switch protects the motor.

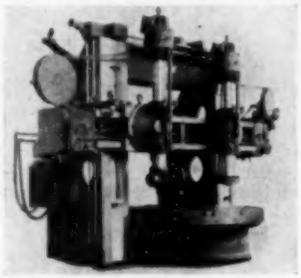
— 80 —

## Grinder, Surface, Rotary, 108-Inch

*G. A. Gray Co., 3611 Woodburn Ave., Cincinnati, Ohio.* [Vol.71,p.1025]

This 108-in. rotary grinder for grinding outside and inside cylindrical surfaces, cones, and flat surfaces consists of a heavy boring-mill table, bed, and driving gearing, to which is attached a pair of housings carrying the grinder mechanism.

The work table is driven by a 5-hp. variable-speed, totally inclosed motor. The two hand levers on the right-hand housing give four changes of speed, while immediately over these levers is a rheostat which con-



trols the speed of the table drive motor.

Two massive housings are bolted to the bed of the machine. These housings are designed when necessary to carry heavy saddles for additional grinding heads. On each saddle is mounted a swivel.

Each spindle ram has a 25-hp., 1,000-2,500 r.p.m., adjustable-speed motor adjusted for dynamic balance. The end of the motor shaft carries a flexible coupling which engages the wheel spindle. The upper end of the wheel spindle turns in a precision-type ball bearing, while the lower end turns in a pair of Timken bearings. Each spindle is provided with a separate counterweight.

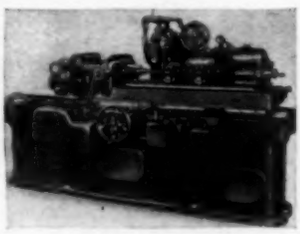
The change gears furnished provide 16 rates of traverse feed, ranging from ¼ to 2 in. per revolution of the table, and twelve different infeeds ranging from 0.00025 to 0.004 in. per traverse. To compensate for this wheel wear, a differential mechanism is introduced into the infeed train, and is driven by a small electric motor through a speed-changing mechanism.

— 81 —

## Grinder, Cam, Hydraulic, Semi-Automatic

*Landis Tool Co., Waynesboro, Pa.* [Vol.71,p.378]

Designed to permit one operator to run several machines, this 50x40-in. semi-automatic hydraulic cam grinder embodies a hydraulically-controlled timing mechanism and work cradle, hydraulic work-carriage traverse, wheel feed, and wheel-



truing fixture; wheel feed, an automatic slow-down work rotation control; a 24-in. grinding wheel, an end drive to the grinding wheel spindle through multiple V-belts, a reciprocating spindle mechanism and additional weight throughout. Truing of the grinding wheel is accomplished by a hydraulically-driven diamond.

The machine is completely motorized and self-contained. Two motors are used, the main drive motor being 15 hp. and the work drive motor ¼ hp. The net weight is 10,000 lb., including both motors.

— 82 —

## Grinder, Crankpin, Hydraulic, Double-Head, Model 84

*Norton Co., Worcester, Mass.* [Vol.71,p.502]

Hydraulic control of work holders, table and wheel-slide traverse are interlocking, so that one cannot be moved while either of the others is in operation, insuring safety to both operator and the work. Mechanically operated steady-rests are a feature.

The workholder spindles on the machine are synchronized and driven by two silent chains. The right-hand workhead is stationary and the left is pro-

vided with a lateral adjustment. Hydraulically-operated clamps grip the work firmly.

Locators on the workholders control the angular and endwise location of the pins. A spacing bar and dogs, with positioning slots, locate the lengthwise position of the worktable for grinding each pin, and the machine may be set for a crankshaft with four, six, or eight crankpins.

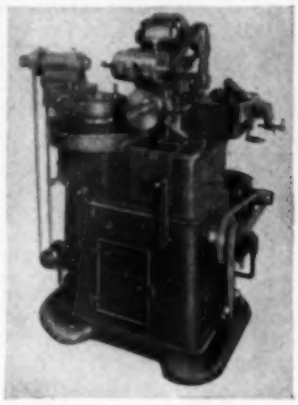
Controls are centered at each side of the operator's position. A single motor mounted on the side of the rear base furnishes power. The machine has a swing of 17 in. in diameter and is made in the following sizes: 24 to 30 in., 30 to 36 in., 36 to 42 in., 42 to 48 in., 48 to 54 in., and 54 to 60 inches.

— 83 —

## Grinder, Special-Purpose, Oscillating, No. 25

*Van Norman Machine Tool Co., Springfield, Mass.* [Vol. 71,p.513]

The No. 25 oscillating grinder incorporates several improved features, principally a two-motor control. One motor



drives the wheelhead. The other drives the idler pulleys that control the workhead rotation and oscillation as well as the automatic feeds. The regular wheel-slide construction is used, but there is a different type of feed mechanism, whereby the feed can be set so as to rough grind the race to within 0.002 in. of the finish ground size of the cup, when it is automatically changed from coarse to fine feed.

The lever on the left-hand side controls stopping or starting of the whole machine. The one on the right controls both workhead rotation and oscillation.

Motors used are: for workhead and automatic feeds, 1-hp. 1,150 r.p.m., for wheelhead, 1½ hp. 3,450 rev. per minute.

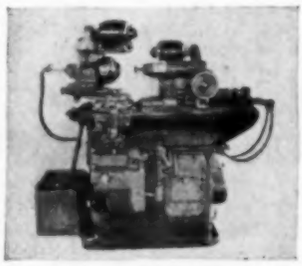
Weight, approximately 1,900 pounds.

— 84 —

## Grinder, Ball-Race, Hydraulic, Semi-Automatic, 5-Inch

*Landis Tool Co., Waynesboro, Pa.* [Vol.71,p.515]

A hydraulic mechanism is applied to oscillate the workhead, feed the wheelhead, and traverse the wheel slide of this 5-in. machine for radial grinding. The operator merely loads the work and throws the main control



lever. The operator can run two machines easily.

Three constant-speed, balanced motors are used. The grinding-wheel spindle runs at 7,760 r.p.m. in steel-backed, babbitted bearings. It is driven through a flat-woven endless belt by a motor mounted on the rear of the wheelhead. Lubrication is by sight-feed oilers.

The grinding-wheel feed is operated by a hydraulic piston and cylinder. The grinding feed movement is regulated easily and stops automatically when the work has been ground to size.

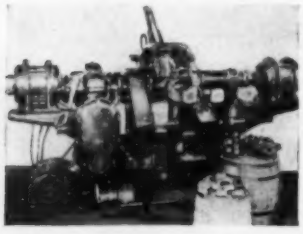
The grinding-wheel truing fixture is attached to the front of the wheelhead only when in use. The head may be adjusted toward the center of oscillation, or at right angles. The oil pump is of the low-pressure, geared type. It is driven by a pulley on the armature shaft of the main drive motor.

## — 85 —

### Grinder, Hexagon Nut, Special, No. 84

*Gardner Machine Co., Beloit,* Wis. [Vol.71,p.516]

This equipment consists of a No. 84 Gardner grinder on which is mounted a rotary attachment with special work-carrier and timing device. On the rotor shaft is mounted a cast-steel disk with a series of studs suitable for the work to



be handled. Two side guides are provided to keep the nuts from turning. On the upper guide is mounted an indexing device which turns each nut one-sixth of a revolution as it passes, thus presenting two new surfaces to be ground. After the nut has been ground on all six surfaces, it is automatically ejected from the studs by two vertical arms actuated by a cam arrangement. The unit is equipped with both a hand and a foot lever connected with the friction clutch for stopping and starting the feeding mechanism.

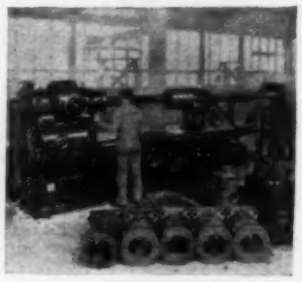
## — 86 —

### Grinder, Cylinder Model J.G.

*Micro Machine Co., Bettendorf, Iowa.* [Vol.71,p.608]

Employing a pantograph spindle drive mechanism, the Model J.G. cylinder grinding machine has been placed on the market. This pantograph drive insures a constant peripheral speed to the grinding wheel. The hydraulic table drive provides traverse speeds ranging from a few thousandths per minute up to several feet per minute in rapid traverse. The push-button stations are convenient for the operator.

The machine has capacity to grind bores ranging from 4 to



24 in. or larger in diameter and up to 48 in. in depth. The main cylinder is 36 in. in length by 14 in. in diameter, and has a 4-in. eccentric throw, thus permitting the maximum use of the grinding wheels. The main work carrying table is 96 in. long without the dust aprons, and 26 in. wide. The distance from the top of the table to the center of the grinding circle is 24 in. This dimension may be increased to suit varying work-mounting requirements. The base casting is 12 ft. 6 in. long by 42 in. wide and the height of the machine overall is 76 inches.

The machine proper is driven by a 10-hp. motor operating at 1,200 r.p.m., and an additional 3-hp. motor is required for operating the dust exhauster. Lengthwise T-slots in the top of the work table permit mounting various types of work-holding fixtures.

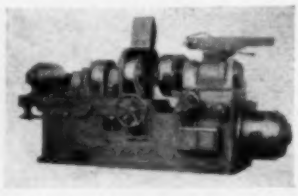
Net weight, 18,000 pounds.

## — 87 —

### Grinder, Brake Drum, Improved

*Cincinnati Grinders, Incorporated, Cincinnati, Ohio.* [Vol. 71,p.1059]

More safety for the operator is provided by the fully guarded grinding wheel. The mounting of the precision grinding wheel spindle on anti-friction bearings is another improvement. To bring the grinding wheel into the work the required distance, an independent infeed attachment driven by a fractional-horsepower motor is provided. A dead stop is provided, arranged for use with either the power or hand infeed. A micrometer indexing mechanism is also provided. The grind-



ing-wheel truing equipment is mounted on the top of the wheelhead and is operated by a hand lever. An improved motor-driven vertical coolant pump is located at the rear of the machine.

This grinder has a capacity to swing work up to 26 in. in diameter, thereby permitting not only the mounting of unmounted drums but also wheel and drum assemblies. Inside diameters up to 22 in. can be ground on mounted drums.

Reciprocation of the work over a short stroke, while the grinding wheel is fed automatically into the work, keeps the ground surface free from wheel marks and insures smooth braking surface for the drum. To facilitate loading and unloading, the travel of the workhead is air-controlled. This grinder is operated on the plunge-cut principle.

The machine is entirely self-contained, the grinding wheel being driven by a 40-hp. motor, and the workhead is powered by a 5-hp., variable-speed, d.c. motor. A generator, mounted on the bed, supplies 230-volt, d.c. power to the headstock motor.

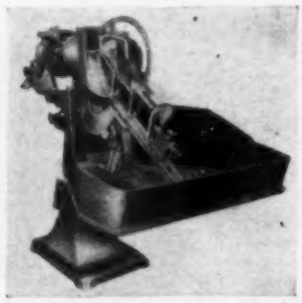
## — 88 —

### Grinder, Drill

*Gallmeyer & Livingston Co., Grand Rapids, Mich.* [Vol.71, p.71]

This drill grinder of the double holder type, with a maximum capacity of 5 in., is suitable for grinding drills from No. 52 up to 5 in. Holders are of the non-calipering type, on which it is possible to change from one size drill to another, from grinding a straight-shank to a taper-shank drill, and from a two-lip to a four-lip drill, without preliminary adjustments.

Small drills are ground dry on a fine-grain wheel on one



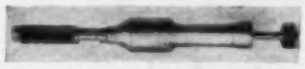
side, and large drills are ground wet on a coarse wheel on the other side. A 1¼-hp. motor is built into the head. Equipment includes wheels, wheel guards, pump, tank, pan, splash guards, and a patented wheel-truing mechanism.

## — 89 —

### Grinder, Die

*Rotor Air Tool Co., Cleveland, Ohio.* [Vol.71,p.339]

Designed to use 1½-in. vitrified wheels, 2½-in. high-speed wheels and ½-in. pencils, this grinding tool is designed for use on dies, metal patterns, finish grinding of brass, aluminum and bronze castings, and scroll work on ornamental pieces. The tool develops ⅓ hp. at 13,000 r.p.m. and weighs 4 lb. Standard equipment includes a wheel arbor for wheels with a ⅜-in. hole and



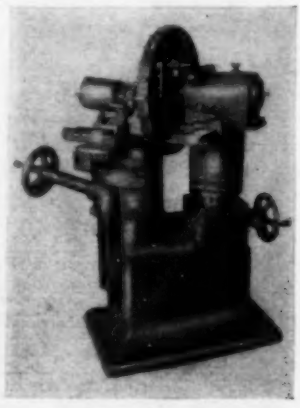
⅜ in. in width. Special arbors are furnished for ¼- and ½-in. holes. A full line of accessory equipment is offered, including a collet for holding ¼-in. shanks and small pencil sticks.

## — 90 —

### Grinder, Face-Mill, "Arc," No. 2

*Oliver Instrument Co., Adrian, Mich.* [Vol.71,p.479]

The No. 2 "Arc" face-mill grinder is heavier than the previous design. The machine grinds face mills up to 26 in. in diameter with fine- or coarse-pitch blades, set either straight or helical, with any desired angle between face and periphery, any desired face clearance, any other desired peripheral clearance, and any required radius at the corner from zero to 2 in. The grinding is accomplished with but one set-



ting of the cutter and one pass of the wheel over the cutter face.

The movements are so controlled that a turn of the operating wheel causes the grinding wheel to traverse the face, turn the corner, and traverse the periphery in one continuous movement.

The cutter is mounted on a spindle in the same way that it is mounted on the milling machine. Means are provided for the mounting of an indicator. Lip rests are provided for grinding various other types.

The spindle has the standard spindle nose and revolves on Timken roller bearings. A spindle-lock is provided, and a binding screw for holding the spindle in a given position. The grinding wheel is direct-connected to the shaft of a ¾-hp. 3,600 r.p.m. ball-bearing-equipped motor, adjustably mounted on a carriage that traverses a slide.

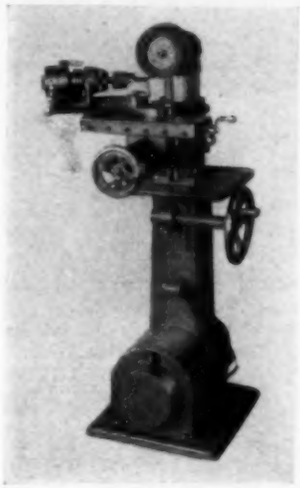
— 91 —

## Grinder, Tap

*Oliver Instrument Co., Adrian, Mich.* [Vol.71,p.484]

This tap grinder cut-grinds all taps having a shank less than 1 in. in diameter, either right- or left-hand and having two, three, or four cutting edges.

An eccentric relief is provided, the exact shape of which is determined by means of a formed cam. Adjustment is



provided for any desired angle of point, to accommodate taper, plug, or bottoming taps. The face or the flute may be ground and the cutting face of a "gun" tap may also be ground.

The tap is held in a chuck by the shank. No center is necessary.

The machine carries a hollow spindle running on ball bearings. An index plate having twelve notches provides means of accurately indexing two, three, or four-flute taps, also a means of locking the spindle while mounting the tap. The entire spindle mechanism may be swung about a graduated base. The machine is operated by a ½-hp. motor.

— 92 —

## Grinder, Drill, No. 21

*Oliver Instrument Co., Adrian, Mich.* [Vol.71,p.486]

The No. 21 drill grinder is a special type for drills of $\frac{3}{16}$ to $\frac{1}{2}$ in. It will produce the Oliver-type point, when desired, and also types of points adapted

for countersinking, counterboring, chamfering, and similar operations. Thick-web oil-hole drills and chamfering or nut-drills can also be ground, the latter type on the point and shoulder.

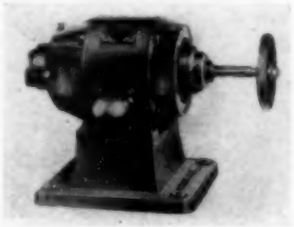
The point angle may be varied from 60 to 180 deg. The drill is located in a jig or fixture which drops into position in a holding mechanism. The spindle is mounted on ball bearings in a swinging frame and is adjusted horizontally by means of a knurled knob. The ¼-hp. driving motor is inclosed in the base and drives the spindle through a flat canvas belt.

— 93 —

## Grinder, Tap

*J. G. Blount Co., Everett, Mass.* [Vol.71,p.493]

This machine, driven by a specially-designed, 1½-hp. Westinghouse Type SK motor, is applied to the grinding of tap flutes by the use of a taper arbor on the end of a spindle and various sizes of grinding wheels. The unit is self-contained, being driven by a direct-connected, totally-inclosed, ball-



bearing-mounted motor with a speed range of 4,000 to 7,000 r.p.m., controlled by a field rheostat. Smooth finish can be obtained because of the close speed regulation.

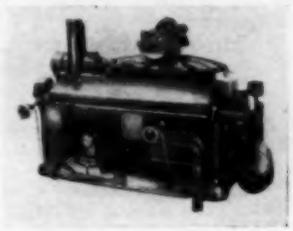
— 94 —

## Grinder, Hob and Cutter, No. 1

*William Sellers & Co., Philadelphia, Pa.* [Vol.71,p.495]

The No. 1 hob and cutter grinder is designed to sharpen straight and spiral hobs, milling cutters, reamers, and taps. It will grind work 12 in. in diameter and 12 in. long and is quickly and easily set. All feeds and indexing are automatic and their setting is facilitated by micrometers. It is possible to grind on both the cutting and return strokes.

The carriage is driven through a crank and elliptical gear. The length of stroke may be varied to suit the work and there are also two speeds at which the carriage may be run. The 10-in. saucer-type wheel is driven by an independent motor, located above the work and carried on a series of slides. The wheel spindle is mounted in ball bearings. The grinding



head can also swivel 45 deg. on either side. The automatic feed includes the vertical feed as well as feeding into the wheel in a circular direction.

The machine requires two 1-hp. constant-speed motors. As the motors drive at constant speed, they can be of either the a.c. or d.c. type. The machine has a central lubricating system operating by gravity. It can be used for either wet or dry grinding. A centrifugal pump connected to the drive supplies water from the settling basin. One operator can run five or six machines.

— 95 —

## Grinder, Chaser, "H. & G"

*Eastern Machine Screw Corporation, New Haven, Conn.* [Vol.71,p.525]

This machine is now furnished with a pedestal mounting and with means for motor drive, the motor being concealed in the pedestal. The wheel on the left

of the machine grinds the throat of the chaser. The wheel on the right of the machine grinds all four cutting faces at once.

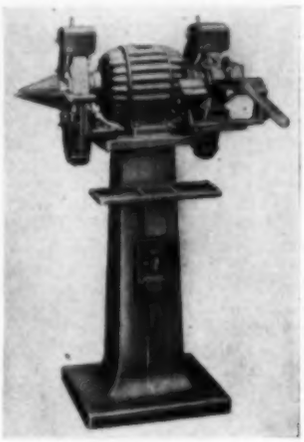
— 96 —

## Grinder, Tool, All-Purpose

*J. G. Blount Co., Everett, Mass.* [Vol.71,p.794]

This all-purpose tool grinder adaptable for use in either the wood shop or the general shop is driven by a 1-hp., 1,750 r.p.m. fully-inclosed, dust-proof Westinghouse motor. This grinder is provided with three wheels. A coarse wheel, 10 by 1½ in., is for general shop use. A fine wheel of the same size is provided. The wheel is provided with a special rest, fully adjustable as to the angle with the wheel face. A grinding cone is provided.

This machine is of the motor-in-head type. The spindle is extra heavy and runs in heavy-duty, deep-groove ball bearings. Double recessing of the flanges provides a double seal against



grit and dust entering either the bearings or the motor. The wheels are fitted with fully-enclosed, approved safety guards that are adjustable to wheel wear, as are also the toolrests.

— 97 —

## Grinder, Cutter, No. 2

*Cincinnati Milling Machine Co., Cincinnati, Ohio.* [Vol.71, p.873]

Both the plain and the universal models embody several improved features of convenience, accuracy, and rigidity. The universal machine consists of a plain machine with a cylinder attachment, surface-grinding attachment, gear-sharpening attachment, and an internal-grinding attachment. The universal machine is supplied only with a motor-driven workhead, a ¼-hp., 1,750 r.p.m. motor being used.

The table slide rides on two long roller chains guided by four ball bearings, two on each

end. The saddle has accurate cross adjustment up to 10 in. The table proper can be swiveled. Over-all dimensions of the table are 5½ by 36 in. and the movement in line with the centers is 18 in. Work 10 in. in diameter can be swung between centers, and the lengths of the work taken are 27 in. between the right- and left-hand tailstocks, and 21½ in. between the right-hand tailstock and the regular headstock centers. Facilities have been provided for attaching the new-style tooth rests for any kind of cutter-grinding job.

The grinding-wheel spindle head has both vertical and horizontal movement, the swiveling movement being from zero to 240 deg. Maximum vertical adjustment is 7½ inches. The drive for the grinding-wheel spindle head is obtained by the use of a special ½-hp., 3,425 r.p.m. motor. Provision is made for taking up belt stretch. A two-step cone pulley arrangement gives two grinding wheel speeds of 3,850 and 5,735 rev. per minute.

A National standard taper hole is supplied on one end of the spindle and a No. 12 B&S taper hole at the other. Four taper collets are supplied for reducing the latter. The cylindrical grinding attachment supplied takes 21½ in. between centers and will grind 12¾ in. in width in one setting. Holes 3 in. deep and ⅞ in. in diameter and larger can be ground by using the internal-grinding attachment. The gear-sharpening attachment grinds straight and staggered teeth uniform and radially on gears up to 8½ in. in diameter. Work 4 in. wide can be ground with a surface-grinding attachment with an extension.

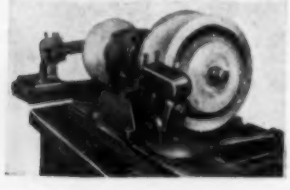
Floor space required, 4 ft. 10 in. by 5 ft. 10½ in.; weights, plain machine, 1,600 lb.; universal machine, 1,750 pounds.

## — 98 —

### Grinding and Lapping Machine, for Tungsten-Carbide Tools

*Advance Diamond Tool Co., 427 West Congress St., Detroit, Mich.* [Vol.71,p.947]

For shops using at least a dozen tungsten-carbide tools, the combination grinding and lapping machine illustrated has been developed. The machine is equipped with the proper wheels for roughing and finishing, driven at the proper speed. Two rim wheels for roughing and finish grinding are mounted,



the roughing wheel being 12 in. in diameter and having a 60-grain grinding grit surface and the other an 8-in. rim wheel having 120-grain grinding grit surface. On the opposite end of the machine there is located a diamond lapping disk. The tool remains set up to the proper angle throughout the entire grinding and lapping operation.

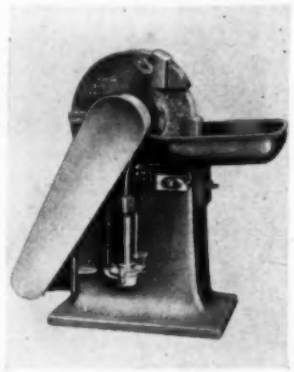
The machine is equipped with an electric rheostat which permits using the exact speed necessary for grinding tungsten-carbide tools. The machine combines the functions of rough and finish grinding and lapping.

## — 99 —

### Grinder, Wet, for Tungsten-Carbide Tools

*J. G. Blount Co., Everett, Mass.* [Vol.71,p.951]

For grinding tungsten-carbide tools, an improved wet tool-grinder has been developed. The machine is of solid construction, having a heavy spindle running



in extra-heavy, self-oiling bearings. A large reservoir for water is located in the column. The friction drive is easily adjustable.

The machine is made in three different sizes, taking 14 by 1½-, 20x2½- and 30x3-in. wheels, respectively. These machines can be obtained for either belt or motor drive. They are fitted with a special wheel.

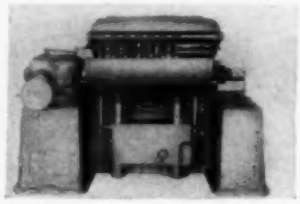
## — 100 —

### Lapping Machine, Crankshaft, Type 50

*Norton Co., Worcester, Mass.* [Vol.71,p.518]

Several improved features are contained in the Type 50 crankshaft lapping machine. One is the mechanical elevating table for raising and lowering work. The lapping time is mechanically controlled.

The lapping arms are counterbalanced and suspended from a vertical position. The arms may be adapted to any crankshaft. The machine is designed to lap all main bearings and crankpins at the same time. It has a capacity for crankshafts up to 42 in. in length. Abrasive paper, cast-iron laps with loose



abrasive, or abrasive sticks may be used. The machine is entirely self-contained and is fully equipped with ball and roller bearings.

## — 101 —

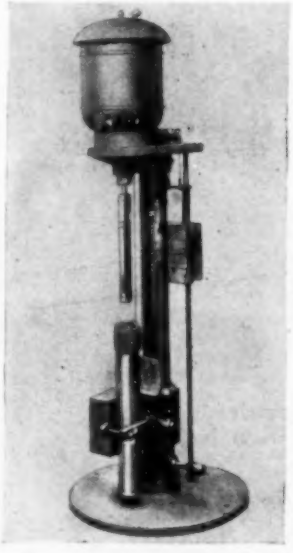
### Lapping Machine, Air-Hammer Cylinder

*Adjustable Lap & Tool Co., Inc., 311 N. Second St., St. Louis, Mo.* [Vol.71,p.568]

Although especially built to grind or lap the cylinders of air hammers, the device shown will lap, grind, or hone a hole of any size from ½ to 6 in. by substituting various-sized hone holders.

The device is intended for bench use and is mounted on a base 16 in. in diameter. It consists essentially of a means for holding the cylinder and a direct-connected electric motor for driving the hone.

The hone consists of a sleeve



having four slots, together with a taper pin for advancing the stones outwardly ¼ in. Adjustment is made through a knurled screw sleeve. The device will remove any taper or out-of-round condition, and will not produce a bell-mouthed hole.

## — 102 —

### Grinders, Floorstand, 6- and 8-Inch

*Hammond Machinery Builders, Inc., Kalamazoo, Mich.* [Vol.71,p.73]

These bench and pedestal type grinders carrying 6- and 8-in. wheels are available with either a.c. or d.c. motors. Oversize ball bearings are mounted in the end head in close proximity to the wheels, and all bearings are tightly inclosed. The motor itself is covered.

Control of the grinders is afforded by a two-pole quick make-and-break switch. Wheel guards and toolrests are ad-

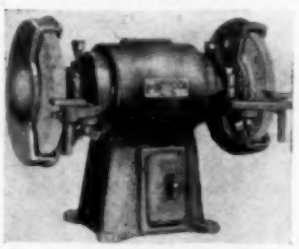
justable and can be removed quickly. Single-phase, a.c. machines are equipped with an improved commutating-type, repulsion-induction motor that can be plugged into a lighting circuit outlet.

## — 103 —

### Grinder, Bench

*Schauer Machine Co., Cincinnati, Ohio.* [Vol.71,p.377]

An improved 1-hp. bench grinder for use with either a.c. or d.c., is mounted on a base containing a safety-type toggle switch. The motor and wheels are inclosed. Bearings are solid - rest, double - roll type.



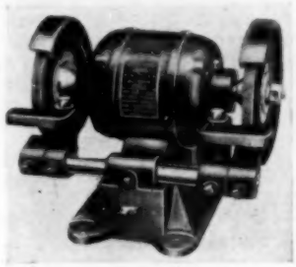
Height from base of grinder to center of wheel is 11 in. Grinding wheels 10 in. by 1 in. are used, running at 2,000 r.p.m. for direct current and 1,750 r.p.m. for alternating current. The machine weighs 162 pounds.

## — 104 —

### Grinder, Bench, 6-Inch, Model 66

*Millers Falls Co., Millers Falls, Mass.* [Vol.71,p.381]

Sufficient power and speed to give good hand grinding is provided in this 6-in. bench grinder. The unit is provided with ball bearings and is driven by ¼-hp. motor of the totally-enclosed type. It carries two 6-in. wheels. Two adjustable guards



are provided, and the toolrests are adjustable for wheel wear or tilt.

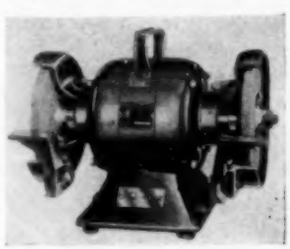
Model No. 66 bench grinder is manufactured for 110-volt a.c. circuits in 60- and 25-cycle models, 220-volt circuits in a 60-cycle model, and 115- and 230-volt circuits in d.c. models. All a.c. units are of single-phase design. The unit is provided with a toggle switch and 8 feet of rubber-covered cable and a rubber plug. Dimensions are: Height 9½ in.; width, 12¾ in.; base, 6¼x 10¼ in. The weight is 41 pounds.

## — 105 —

### Grinder, Bench, Portable, 6-Inch

*Black & Decker Manufacturing Co., Towson, Md.* [Vol.71, p.381]

Designed for use with alternating current only, this 6-in. ball-bearing, portable electric bench grinder is planned to sell



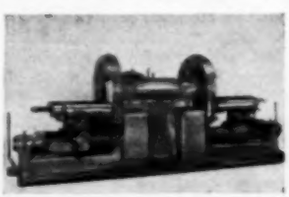
within the price range of the 6-in. and 8-in. sleeve-bearing tools. The grinder maintains a spindle speed of 3,600 r.p.m. on 60-cycle current and 3,000 r.p.m. on 50-cycle current.

## — 106 —

### Grinder, "Super Disc," 40-Inch, No. 9

*Gardner Machine Co., Beloit, Wis.* [Vol.71,p.501]

This machine has two 40-in. steel wheels faced with heavy-type Gardner G.I.A. disks. The spindle is carried in Timken bearings, and is driven by spiral



bevel gears. The machine operates semi-automatically.

The unit is powered either by belt or by a direct-connected motor of from 25 to 40 hp. Its two work tables are adjustably supported on a cast-iron shaft, with the outboard bearing housings supported on the floor for their full length. Mechanical means are provided for locking the tables automatically. Each may be operated independently of the other. Oscillation of the work ables is regulated by hand and foot levers, and the work is fed into the cutting member by spring tension.

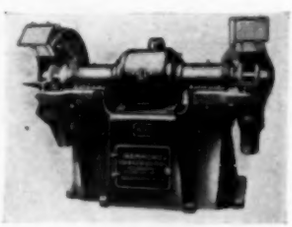
Weight, 16,000 pounds.

## — 107 —

### Grinder, Electric, Heavy-Duty, Type WH "Ace"

*Hammond Machinery Builders, Inc., Kalamazoo, Mich.* [Vol.71,p.383]

Construction heavy-duty work is found in the type WH "Ace" heavy-duty electric grinder. This grinder is equipped with inclosed motors, air cleaners, and four oversize ball bearings. Boiler-plate adjustable steel wheel-guards of approved type, together with hinged doors, ex-



haust-pipe connection, adjustable spark-and-chip breaker and eye shield, are features. Grinding wheels are not supplied regularly, but can be furnished to order. Machines are available for 220-, 440-, and 550-volt, 2- or 3-phase, 25-, 40-, 50-, and 60-cycle a.c. circuits and 110,- 220-, and 550-volt, d.c. circuits.

Oil reservoirs are provided. The automatic motor starter with push-button control and overload protection is mounted on the inside of the pedestal door for convenience. The machine is made in 5-, 7½-, and 10-hp. sizes.

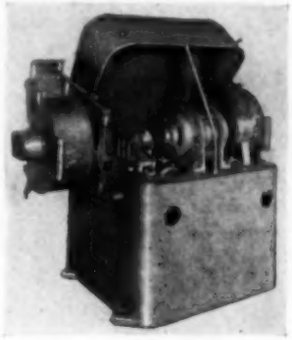
## — 108 —

### Grinder, Heavy-Duty, "Rite Speed"

*Safety Grinding Wheel & Machine Co., Springfield, O.* [Vol.71,p.723]

By means of a safety interlock between the wheel diameter and the spindle speed on "Rite-Speed" grinders, it is possible to increase the grinding-wheel speed as the wheel wears away and thus maintain normal grinding conditions, at the same time using a normal size constant-speed motor. A number of such changes can be made during the life of the wheel. A standard ball-bearing a.c. motor is used in the grinder.

The machine is adaptable for wheels or organic bond or for vitrified wheels. The machine is built in four sizes, having distance between wheels of 55, 55, 48, and 48 in., respectively, wheel sizes of 30x3 in., 24x4 in.,



20x3 in. and 16x3 in., respectively. The smallest wheel diameter for clear grinding is 12, 11½, 10½, and 10½ in., respectively. The floor space required by the largest machine, with hoods, is 48x50 in., and the weight is 2,800 pounds. Motor size depends upon requirements, ranging from 7½ to 15 hp. for the largest size.

## — 109 —

### Grinder, 7-Inch, "Flex-Disc"

*Van Dorn Electric Tool Co., Cleveland, Ohio.* [Vol.71,p.762]

This 7-in. "Flex-Disc" grinder is a companion unit for the 9-in. grinder, and is suitable for smoothing metal surfaces before plating, smoothing welded and soldered joints and seams,

cleaning dies, and any other work requiring filing, sanding, and emerying.

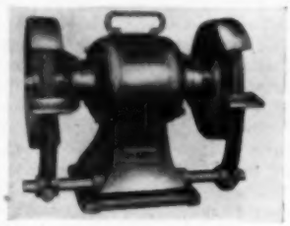
The improvements on the 7-in. grinder, which have also been applied to the 9-in. unit, are a removable pipe handle, and right- and left-hand bosses.

## — 110 —

### Grinder, Bench, 7-Inch

*Van Dorn Electrical Tool Co., Cleveland, Ohio.* [Vol.71, p.868]

For sharpening all sorts of edged tools and for light grinding, this 7-in. bench grinder is a compact, sturdy machine with



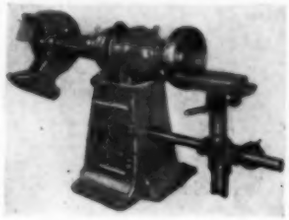
the ball bearings mounted in dustproof housings. It is smooth running and vibrationless at all speeds. It is furnished complete with grinding wheels, adjustable toolrests, wheel guards, switch and cable, and is available for all standard voltages and currents.

## — 111 —

### Grinder, Combination

*Standard Electrical Tool Co., 1938 West 8th St., Cincinnati, Ohio.* [Vol.71,p.876]

A combination grinder with a ring-wheel chuck on one end and an emery wheel on the other end is being manufactured. Ball bearings are of SKF



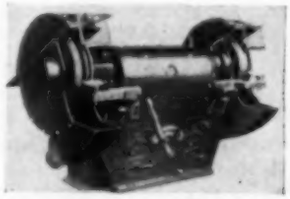
manufacture, and there is also a ball thrust bearing to take the end-thrust of the chuck. The machine is made in 2-, 3-, 5-, and 7½-hp. sizes. This grinder is an addition to the standard line.

## — 112 —

### Grinder with Gibbs V-Disk Transmission

*United States Electrical Tool Co., Cincinnati, Ohio.* [Vol.71, p.907]

A Gibbs V-disk transmission is employed in this grinder. The disks used in the transmission are of graphite-impregnated Micarta and are durable, accessible, and low in replacement cost. They are suitable



for operation at 9,000 ft. per minute.

Two changes of spindle speed are available during the life of the grinding wheels, in order that they may be run at nearly 9,000 ft. per min. The grinder is regularly made to carry

wheels 18x2, 20x2, 24x3, and 30x3 in. in diameter.

The grinder is built in accordance with the safety code of American Engineering Standards Committee and the motor is built to the A.I.E.E. standards. The spindle is mounted on four SKF ball bearings.

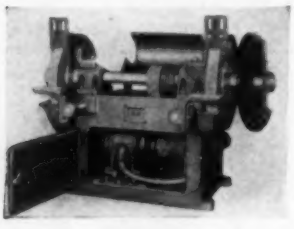
The machine is available for operation on 220-, 440-, and 550-volt, 25-, 30-, 40-, 50-, and 60-cycle, 2- or 3-phase a.c. circuits.

## — 113 —

### Grinder, "Multi-Speed"

*Hisey-Wolf Machine Co., Cincinnati, Ohio.* [Vol.71,p.912]

Correct grinding wheel speeds for high-speed snagging are always maintained on the Texrope-driven grinder. This "Multi-Speed" machine is equipped with a 10-hp. motor designed to drive 24-in. grinding wheels at 9,500 s.f.p.m. When the wheels are worn to 20 in. in diameter, the spindle speed is



increased to 1,800 r.p.m. by moving the wheel guards back so that the Texrope belts can be transferred to the smaller spindle pulley. The combination speed change and safety device, which interlocks with the wheel guards, makes certain that the speed of the grinding wheels will not drop below 7,500 s.f.p.m. or be increased beyond 9,500 s.f.p.m., the maximum safe speed.

The machines are furnished for standard motor specifications of 220 and 440 volts, 50 or 60 cycles and 2 or 3 phase circuits. They carry 24x3x12-in. wheels, the distance between the wheel centers being 45½ in. The height from the bottom of the base to the center of the spindle is 34½ in. Net weight is 2,525 pounds.

A single-speed machine, built in three sizes, is also available. The wheels carried are 24, 20, and 18 in. in diameter, respectively. Spindle speeds are 1,550, 1,800, and 2,000 rev. per minute.

## — 114 —

### Grinders, Portable Pneumatic Standard and High-Production, Type D-O

*Rotor Air Tool Co., Cleveland, Ohio.* [Vol.71,p.505]

The type D-O grinder is designed for 4x1-in. grinding wheels. The D-O model is suitable for light grinding on a

bench or in close quarters. Two models are provided, one with a free speed of 6,000 r.p.m. for vitrified grinding wheels, the other the high-production model running at 8,000 r.p.m. for rubber- or bakelite-bonded wheels. Both models are equipped with a rotor governor.

## — 115 —

### Grinders, Swing-Frame, "200 Series"

*Safety Grinding Wheel & Machine Co., Springfield, Ohio.* [Vol.71,p.796]

Three sizes of swing-frame grinders, Nos. 204, 210, and 205, respectively, have been placed on the market. The wheel sizes taken by these units are 24x3 in., 20x3 in., and 16x3 in., the wheel holes being 12, 8, and 6 in. High-speed, or-

ganic-banded wheels may be applied. A feature is the safety interlock.

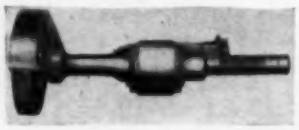
Drive direct from the motor to the wheel by two V-belts is used, and control is through a push button on the hood. Changing a wheel can be accomplished in five minutes. An a.c. motor is employed, and stepping up the speed is obtained by changing the sheave size, three speeds being obtained on the No. 204 and two on the others.

## — 116 —

### Grinder, Portable, Pneumatic, Rotary, No. 88

*Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.* [Vol.71,p.799]

The first of a line of "CP" pneumatic tools employing the rotary principle, the No. 88 rotary grinder is available with two types of handles, either straight or pistol grip, and will carry an 8x1-in. elasic bonded



wheel, or 6x1-in. vitrified wheel.

A four-vaned rotor rotates on a spindle in a casing having suitable openings for the admission and escape of compressed air. Even distribution of air upon the vanes assures efficiency. The No. 88 grinder provides a high ratio of power per pound of weight. The grinder is governor-controlled, non-vibrating, and has a removable air strainer, heavy-duty radial and thrust ball bearing on the wheel end, a renewable, hardened rotor liner, and an automatic oiler in the rotor housing, with grease plugs in the handle and gear case ends.

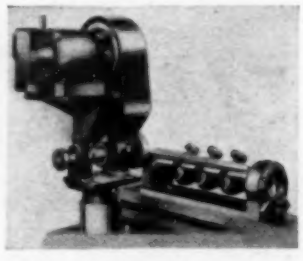
Standard equipment includes a 6- or 8-in. wheel guard, as specified, but no grinding wheels are supplied.

## — 117 —

### Grinding Fixture, Centerless, Support Blades

*Cincinnati Milling Machine Co., Cincinnati, Ohio.* [Vol.71, p.222]

This is an attachment to be used with the No. 1½ plain cutter and tool grinder used for regrinding the wearing surfaces of all standard support blades for the Nos. 2, 3, and 4 centerless grinders made by Cincinnati Grinders, Inc. Blades that are reground will not be affected by warping. Time required to make the set-up is only 2 min., and support blades are finished all over, except the



wearing surface prior to the grinding operation.

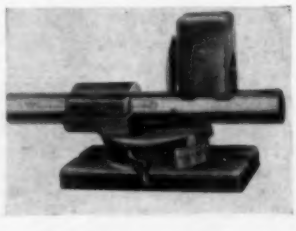
The fixture is made of aluminum, and will take support blades with a maximum length of 16⅛-in., ⅜ in. wide, and 4 in. high to be ground at any angle from a flat top to 45 degrees.

## — 118 —

### Grinding Fixture, Chaser, Universal

*Geometric Tool Co., New Haven, Conn.* [Vol.1,p.517]

This universal chaser-grinding fixture is used to grind chasers on both the cutting face and chamfer. Milled chasers, tapped or hobbed diehead chasers, collapsing-tap chasers, all may be reground with this



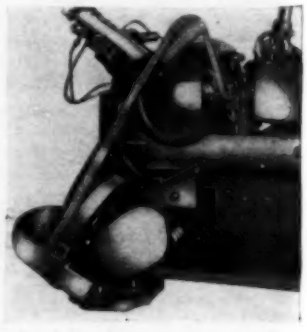
fixture, which will produce a flat, a concave, or a convex chamfer. The cutting faces of all these chasers may be reground on the same fixture, which may be used on any universal surface grinder.

## — 119 —

### Hopper, Floor-Level, for Centerless Grinders

*Çincinnati Grinders, Incorporated, Cincinnati, Ohio.* [Vol. 71,p.1028]

Full automatic grinding on straight cylindrical work, such as piston pins, is obtained on Cincinnati centerless grinding machines by using this floor-level type hopper. By eliminating all manual feeding opera-



tions, this hopper makes it possible for one man to operate a battery of machines, his only job being to fill the work basin of the first machine and to check the size and finish of the pieces being ground.

This hopper is individually motor driven. The variations in feed to suit the flow of work through the machine is obtained by means of a worm and wheel reduction connected to the rotated carrier disk.

This hopper can be disconnected easily and removed from the machine. Because of its low level, this type of hopper is adapted to handle work through a series of consecutive machines, since the basin is low and gravity is utilized to bring the work from one machine to the basin of another.

## — 120 —

### Hopper, In-Feed "Feed-Matic," for Centerless Grinders

*Cincinnati Grinders, Incorporated, Cincinnati, Ohio.* [Vol. 71,p.1064]

The Feed-Matic in-feed hopper, when used in conjunction with a centerless grinder equipped with the automatic in-feed attachment, is suitable for the automatic grinding of cylindrical work with a shoulder, such as valve tappets, bolts, and rivets. This hopper is powered by an inclosed, ¼-hp. motor with push-button control. The mo-

tor drives a pick-up plate that swings vertically through an arc.

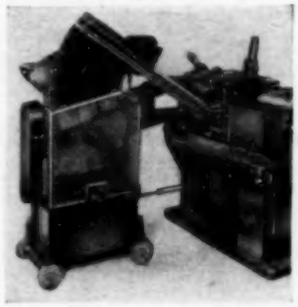
The ejector rod on the automatic in-feed attachment controls the timing of the hopper. Changing this in-feed hopper to a through-feed hopper is possible.

— 121 —

### Hopper, Through-Feed, "Feed-Matic," for Centerless Grinders

*Cincinnati Grinders, Incorporated, Cincinnati, Ohio.* [Vol. 71,p.1064]

The Feed-Matic through-feed hopper handles such work as cylindrical grinding of piston pins and bushings. A gravity chute down which slide the straight cylindrical parts onto the work-support blade is the feature. The hopper can be



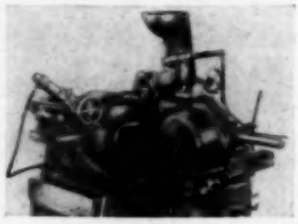
moved easily up to and away from the grinder. An adjustable tie rod keeps the hopper in the proper position. To compensate for wheel wear and to maintain alignment for accurate feeding, a cross adjustment is provided. Anti-friction bearings are used, wearing parts are hardened, and ample lubrication facilities are provided. If desired, additional parts can be supplied to convert the through-feed hopper to an in-feed hopper.

— 122 —

### Hopper for Feeding Tapered Parts

*Cincinnati Grinders, Incorporated, Cincinnati, Ohio.* [Vol. 71,p.1064]

This motor-driven hopper and fixture is for feeding tapered parts. Work is dumped into the basin, a vertical agitating tube selects the parts, and they are shifted so that the small end is down. Each part drops through a tube into position and a combination pusher and ejector arm forces it between the wheels the required depth for sizing and ejection of the piece. One man can operate a number



of machines with this arrangement.

The fixture used in connection with this hopper includes the work rest and blade of the correct taper. A tapered truing attachment over the regulating wheel is required.

— 123 —

### Spindles, Grinding Machine

*Ex-Cell-O Aircraft & Tool Corporation, Detroit, Mich.* [Vol71,p.607]

Two grinding machine spindles, the first an internal grinding machine spindle for the No. 12 Hydromatic grider, manufactured by the Greenfield Tap & Die Corporation, and the second a spindle for surface grinding machines, have been placed on

the market. Both types are provided with ball bearings, and are of the fundamental design found in the company's line.

## *Lathes*

— 124 —

### Lathe, Automatic, Hydraulic

*Monarch Machine Tool Co., Sidney, Ohio.* [Vol.71,p.522]

This hydraulic automatic lathe is designated as the No. 3. Both front and rear carriages can be equipped with length-feed and quick traverse. The complete cycle of both carriage and tool slide is automatic and all controls are hydraulic. Diameter and length stops are adjustable and positive. Feeds can be changed quickly and an automatically varying rate can be secured.

The headstock unit is a separate casting with Timken bearings. A multiple-disk driving clutch takes its power from the motor mounted in the base, driving the spindle through a worm. Pick-off gears on the front of the headstock provide a

quick means of securing any spindle speed desired. All working parts dip in oil. A coolant pump of 80 gal. per min. capacity is mounted in the headstock housing and is driven from the main motor. One starting-lever spindle controls the coolant and hydraulic feeds on both carriages.

The middle section is the chip and coolant reservoir. The tail-end housing contains the hydraulic mechanism. A 2 hp. motor drives two Oilgear hydraulic pumps. A positive stop determines the length of carriage travel. The tool slides are supported on two round hardened-steel bars. The cross-feed hydraulic cylinder is placed in the toolslide between the bars. A diameter-stop determines the depth of cut and cross-tool travel of the toolslides. Either toolslide can be reversed instantly and returned to the starting position from any point in the cycle. The tailstock spindle can be controlled manually, hydraulically, or by air. Any desired spindle speed up to 800 r.p.m. is available.

— 125 —

### Lathe, 12x18-Inch, "Carbo-Lathe"

*Porter-Cable Machine Co., Syracuse, N. Y.* [Vol.71,p.483]

Although the "Carbo-Lathe" is built to use tungsten carbide as a cutting agent, no efficiency is lost when high-speed tool steel is employed. There are only four major parts used in its entire construction. Rigidity is obtained by having the headstock and the bed in a single casting of chrome-nickel iron. The tailstock is of heavy one-piece construction and is rigidly clamped to the bed. The spindle height from the floor is 42 in., while the highest part of the machine is 48 inches.

Power is furnished by a motor of 3 or 5 hp. concealed in the cabinet base. Spindle change feed gears are furnished to give a ratio from 9.1 to 1 maximum, to 1.75 to 1 minimum, between the clutch shaft and spindle. Carriage feed gears are provided. The spindle revolves on Timken roller bearings. The spindle has a $1\frac{7}{16}$-in. hole entirely through it.

The construction of the bed is such that both lubricant and chips fall through the center. Another feature is the automatic shut-off of the coolant as the spindle stops.

This lathe is especially designed to take care of short pieces not over 18 in. in length and 7 in. in diameter. It is adapted for secondary operations on screw-machine parts, pistons, or forgings, and for turning pinions, gears, bronze or iron bushings, shafts, piston rings, and similar parts, at the correct speed and feed required by the tungsten-carbide and high-speed steel tools.

The facing attachment is movable along the bed, is rigidly clamped to tailstock shears in

any position, and is driven from a rack in the bed ways. The cross-slide is cam operated, allowing fast and slow speeds, with quick return. Maximum of travel is 3 in. with a dial adjustment of 2 in. A wheel-operated tailstock is standard equipment. An air cylinder up to 6 in. in bore can be used for operating chucks, collets and expansion arbors. Other attachments that can be furnished are: Lever chuck closer, taper attachment carriage, and turret.

— 126 —

### Lathe, Engine, Selective-Head, 14-Inch

*Lodge & Shipley Machine Tool Co., Cincinnati, Ohio.* [Vol.71,p.491]

This 14-in. selective-head engine lathe for either toolroom or production work, has parts of liberal size, but the machine is easy to operate. The swing is $16\frac{1}{2}$ in. over the bed and $10\frac{1}{2}$ in. over the carriage. On a 6-ft. bed, the distance between centers is $33\frac{1}{2}$ inches.

Twelve hardened gears on

ball-bearing-equipped, splined shafts give twelve spindle speeds. The gears revolve in oil. The headstock is driven through a pulley having an improved disk-clutch. A feature is the reverse to the leadscrew. The leadscrew or feed rod, or both, can be thrown out through a clutch at the feed-box end.

The double-nosed spindle, right-angle bearing of the carriage on the bed, chilled ways, a special compound rest that eliminates top-slide overhang, micrometer ball stop, and double levers for apron friction have also been retained.

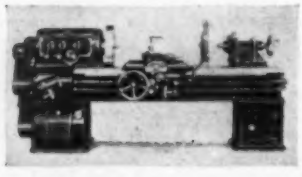
The motor drives through a flat belt with an idler. The taper attachment, draw-in chuck, and pan can be furnished.

## — 127 —

### Lathes, Engine, "Tritrol," 14- to 24-Inch

*Sidney Machine Tool Co., Sidney, Ohio.* [Vol.71,p.506]

Six "Tritrol" lathes in 14-, 16-, 18-, 20-, 22- and 24-in. sizes have been placed on the market. Each machine has eight spindle speeds. The Tritrol lathe is offered with two distinct types of headstocks, having three spindle control levers. The difference between the headstocks lies in the types of gears employed and the spindle bearings. Constantly-meshing, spur-tooth or herringbone, continuous-tooth gears, and Timken tapered roller bearings on all shafts or Timken bearings on intermediate and drive shafts and tapered bronze bearings on the spindle are the features of the two respective types. Positive jaw clutches permit changing of spindle



speeds with the spindle in motion. Forced-feed lubrication is supplied.

The apron is of double-walled box-type construction. Instantaneous stopping and starting of the longitudinal and cross feeds is made possible by a positive snap lever control. The carriage is supported on three bearings. A special type of Texrope drive with V-belts can be furnished when desired.

The nominal base bed length for the first four sizes is 6 ft. and for the latter two, 8 and 10 ft., respectively. The swing over the carriage ranges from 10¾ to 16 in., the swing over the compound rest bottom slide, 9¾ to 14¾ in. The distance between centers ranges from 2 ft. 4 in. for the smallest size to 4 ft. for the largest size, and the size of motor recommended ranges from 3 to 10 horsepower.

The range of feeds per inch for the smallest machine is from 0.005 to 0.150 in., and for the largest machine, 0.005 to 0.155 in. The number of thread and feed changes is 40 in the first four machines and 32 in the last two machines. The headstock spindle speeds range from 13 to 414 r.p.m. for the first machine and from 8 to 350 r.p.m. for the last machine.

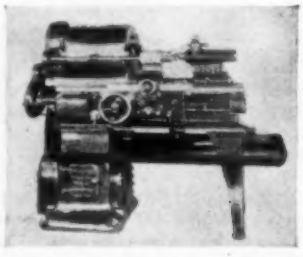
## — 128 —

### Lathes, Engine, Geared-Head, High-Speed, 14- to 26-Inch

*Springfield Machine Tool Co., Springfield, Ohio.* [Vol.71,p.533]

The 14- to 26-in. geared-head engine lathes have been adapted for the tungsten-carbide cutting tools. Timken bearings have been introduced.

Drive is taken from the motor to the main driveshaft by



an endless belt, and from the drive shaft inside the headstock to the spindle by a silent chain. Arrangements for changing the speed have been made by means of different-sized pulleys. The motor is mounted in the heavy, cabinet-type leg.

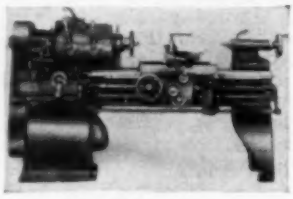
## — 129 —

### Lathe, Engine, 16-Inch, "Coneless"

*Boye & Emmes Machine Tool Co., Cincinnati, Ohio.* [Vol.71, p.677]

A headstock known as the "Coneless" is used on this 16-in. lathe. This headstock employs thirteen gears giving twelve spindle speeds from 15 to 402 r.p.m. Gears and clutches are of heat-treated alloy steel, oil hardened and drawn to a Brinell hardness of 461-477. Back-gears are mounted in front of the spindle and are used for eight of the twelve speeds. A quick-change gearbox furnishes 40 changes of thread leads or feeds.

Standard equipment consists of large and small faceplates, steadyrest with 5-in. opening, toolpost, and necessary wrenches. A taper attachment may be bolted and doweled to the back of the carriage. The taper attachment will turn to an included angle of 12 deg. per foot



or 2½ in., and it will turn 15 in. at one setting. The carriage is drilled and tapped to receive the taper attachment.

Specifications: Swing over bed, 18½ in.; swing over carriage bridge, 12½ in.; swing over compound rest, plain bottom, 11¼ in.; swing over taper attachment, 10⅜ in.; hole in spindle, 1 5/16 in. in diameter; travel of compound-rest top slide, 4 in.; feeds per revolution of feed rod, from 0.004 to 0.112 in., range of screw threads per inch, from 2 to 56; floor space required for the 6-ft. bed, 32 in.x7 ft. Weight, 3,000 pounds.

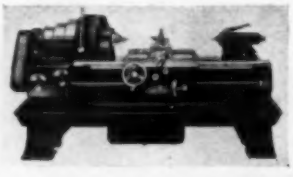
## — 130 —

### Lathe, "Maxi-Production"

*Cincinnati Lathe & Tool Co., 3207 Disney St., Oakley, Cincinnati, Ohio.* [Vol.71,p.792]

A spindle speed of 1,000 r.p.m. or more is available on the "Maxi-Production" lathe for obtaining the best results from tungsten-carbide tipped tools. This spindle is made from a 0.60 carbon steel forging and has a 2⅜-in. hole clear through for bar stock. Timken bearings are employed in the spindle mounting. By operating a lever on the headstock, the spindle is stopped and started instantly through a positive friction clutch and brake, but the cone continues to run until stopped by the countershaft clutch.

The headstock has been strengthened and affords protection against a revolving pulley or belting. It may be supplied with or without back-gears. The tailstock permits a wide range of adjustments at different angles of the compound rest. Either a quick-acting or the standard screw feed arrangement may be furnished. The feed box covers a wide range of feeds from coarse to fine feeds. It may be replaced at any time with a quick-change device for screw cutting.



A plain rest is provided with regular equipment, but any of the standard rests or turret attachments can be applied.

Regular equipment includes: Double-plate apron, plain block rest, bushing with two centers, self-oiling, two-speed countershaft, automatic stop, screw-operated tailstock, large and small faceplates, and the necessary wrenches. Extra equipment includes turrets on the bed or carriage, taper or draw-in attachments, oil pan, pump, quick-acting tailstock, connected toolrests, and a belt shifter.

## — 131 —

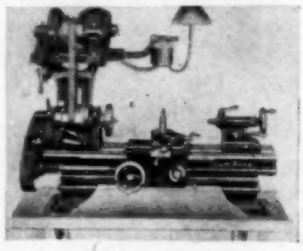
### Lathes, Regular and Junior, 9-Inch

*South Bend Lathe Works, South Bend, Ind.* [Vol.71,p.798]

Both the regular and junior "New Model" bench lathes are backgeared, screw-cutting engine lathes, differing only from the larger machines in the company's line in respect to capacity. Both operate from the lamp socket, and will turn a 2-in. steel bar to 1½ in. in one cut.

The regular lathe has automatic cross and longitudinal feeds, a graduated compound rest for setting the cutting tool at any angle; a micrometer collar and cross-feed screw for adjusting the depth of the cut to 0.001 per in.; a quick-acting latch reverse; six spindle speeds; a precision leadscrew for cutting 4 to 40 threads per inch, and a safety interlock to prevent accidental injury to the lathe. The unit is made in five styles of drive, several lengths of bed, and with bench, floor, or cabinet legs.

The Junior bench lathe is illustrated. The silent chain drive, consisting of a motor, inclosed automatically lubricated



chain and sprockets, and the jackshaft cone pulley are mounted over the lathe headstock entirely out of the way of the operator, chips and dirt. They are carried on a bracket supporting a tilting table, which carries the motor and provides easy belt shifting. Belt tension is adjusted independently of the tilting table. This machine also operates from a lamp socket and has the same features as given above. It is made in several lengths of bed from 2½ to 4½ ft., and can be obtained with either bench or floor legs. It is useful in the toolroom and factory, for making dies, master gages, and a wide variety of parts up to 9½ in. in diameter.

## — 132 —

### Lathe, Turret, Universal, No. 5-A

*Warner & Swasey Co., Cleveland, Ohio.* [Vol.71,p.476]

This machine, the largest ever built by this company, has a capacity through the spindle and the 30-in. chuck for 10-in. bars, and a maximum turning length of 62 in. For chucking work, the maximum swing over the covers for the ways is 32 in., and over the cross slide, 26¼ in. Twelve speeds are available, and twelve feeds are obtained independently in the hexagon turret and cross-slide aprons.

Power is applied through a single pulley mounted on a high-speed drive shaft located at the lower rear end of the head. From this point, the drive is carried upwards to the spindle through a series of sliding gears and splined shafts. The spindle and all head shafts are mounted

on Timken roller bearings. Starting, stopping, and reversing are accomplished through multiple-disk clutches and are controlled by interlocking levers.

To insure lubrication of the head, oil is drawn from a reservoir by a pump through a Purolator, to a large trough in the rear top of the head.

A power rapid traverse has been provided for moving the hexagonal turret. A mechanical interlock eliminates the possibility of engaging the power-feed and the rapid traverse at the same time.

The turret feeds are automatically disengaged by adjustable stop-dogs on a roll located between the V's. By swinging the stop, an entire set-up of tools can be moved toward or away from the spindle without disturbing the stop-dogs on the roll.

All feeding and rapid-traverse motions, as well as threading motion, are carried to the hexagon turret saddle and cross-slide by a long nut in each apron, rotating on ball bearings on this lead-screw. A change-gear box for threading is located at the head end of the feed-shaft. A full-swing side carriage is mounted on the front V.

## — 133 —

### Lathe, Turret, Cross-Sliding, Type H

*International Machine Tool Co., Indianapolis, Ind.* [Vol.71, p.520]

This machine is heavy and powerful. Bed and headstock are a one-piece casting of nickel-chromium alloy iron. Under

this is the oil pan, cast integral with the legs. All gearing is made of alloy steel, heat-treated, and has Maag teeth. A total of 77 sets of anti-friction bearings is used.

The drive is direct, the motor being mounted on the primary driveshaft. Aprons are one-piece castings with gears running in oil. A positive lock is provided for the leadscrews. Rapid-traverse mechanisms for the carriages and feeds are both independent. The clutch has been improved to hold the work rigid under heavy cutting with the new cutting alloys, and a brake stops the spindle instantly when the clutch is thrown out.

Specifications of the 1H size, which is next to the smallest, are: Swing over ways 24 in.; swing over carriage, 22½ in.; hole in spindle, 6¼ in.; travel of turret carriage 44 in.; travel of toolpost guide, 40 in.; chuck diameter, 18 in.; motor hp., 10 or 15; range of feeds, 0.007 to 0.500 in.; size of toolpost tools, 1x1⅛ in.; number of screw-cutting change gears, 9; threads that can be cut per inch, 2 to 32; number of spindle speeds, 8; spindle speeds, 10 to 220 rev. per minute.

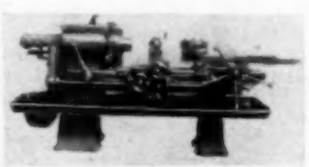
## — 134 —

### Lathe, Universal Turret, No. 4

*Gisholt Machine Co., Madison, Wis.* [Vol.71,p.685]

With a turret that is clamped and unclamped automatically, the No. 4 universal turret lathe has been announced. A bevel clamp ring, operated by an eccentric toggle, is opened and closed about the base of the turret by the backward and forward movement of the turret slide. The strain of the cut is taken by the clamp ring. The turret stop roll permits adjustment to 0.002 in. between the automatic feed trip and dead stop.

A single lever controls starting, stopping and reversing of the spindle. Twelve spindle



speeds, 28 to 751 r.p.m., are obtained selectively. A brake is applied automatically at the neutral position of the control lever and a special safety latch prevents starting the spindle accidentally. Hardened alloy steel headstock gears mounted on splined shafts and tapered roller bearings on the spindle and the drive shafts are features. Lubrication of all bearings and gears in the headstock is by means of centrifugal lubrication. Drive is taken from a motor mounted behind the headstock leg, through Texrope belts to a balanced driving pulley on the headstock.

A square turret is mounted on the front of the bridge-type cross-slide. It indexes automatically with the release of a clamping lever. An auxiliary toolholder may be mounted on the rear of the cross slide for cutting off or for use with a taper attachment. Eight selective speeds in the apron range from 0.002 in. to 0.067 in. The apron parts, as well as those in the turret apron, run in oil. A hand pump is located below the cross-slide apron for lubricating the bed ways, cross slide, and cross-feed screw.

Specifications: Hole through automatic chuck tube, 2⅞ in.; hole in spindle, 2⅞ in.; diameter of three or four-jaw chuck, 10 or 12 in.; maximum distance from face of turret to end of spindle nose, 31 in.; longitudinal travel of hexagon turret, 14 in.; speed of motor, 1,200 r.p.m.; floor space, 40x99 in.; length of bar feed beyond pan, 38 in.; net weight, 3,450 pounds.

## — 135 —

### Lathe, Turret, Universal, No. 5

*Warner & Swasey Co., 5701 Carnegie Ave., Cleveland, Ohio.* [Vol.71,p.751]

A No. 5 universal turret lathe, with a 12-speed, all-geared head, has been added to the line of ram-type turret lathes manufactured by the company. This machine has a bar capacity of 2 in. for round stock, and 13 in. effective turning movement of the turret slide for any one setting of the saddle

along the bed. The maximum swing over the bed is 19 in. and over the cross slide, 9¼ inches. The head and bed are cast in one piece of nickel semi-steel.

Twelve spindle speeds are available, ranging from 26 to 658 r.p.m. A patented speed indicator shows instantly the spindle speeds for various positions of the levers. The working spindle and head gear shafts revolve on Timken roller bearings. The entire head runs in a bath of oil. Forward and reverse multiple-disk clutches are mounted on a high-speed driving shaft.

The universal cross-slide carriage has six, power-operated, longitudinal and cross feeds. All feeds can be reversed. Lubrication of the cross-slide unit is concentrated at three points.

The hexagon turret unit incorporates several features that tend to prolong its life and accuracy and add to its rigidity. Six power-operated feed changes are contained in an apron mounted at the front of the saddle and are independent of those in the cross-slide apron. For bar work, the machine is furnished with an automatic chuck and bar feed of improved design.

A taper attachment can be fitted to the rear of the cross-slide carriage. It will cut tapers up to 3 in. per ft. in lengths of 8 in. The chasing attachment for the cross carriage, also furnished on special order, can be used to cut from 4 to 32 threads per inch.

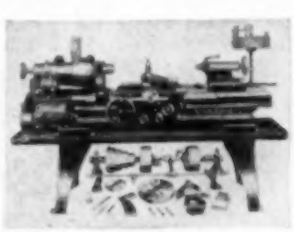
## — 136 —

### Lathe, Toolroom, Precision "New Model"

*South Bend Lathe Works, South Bend, Ind.* [Vol.71,p. 217]

The "New Model" toolroom precision lathe has been developed for the production of master taps, thread gages, special screws, dies, fixtures, tools, and similar products. It is built in the 11- to 18-in. sizes inclusive, in several different designs, including countershaft-drive and motor-drive types, and with either straight or gap beds.

The quick-change gearbox provides 48 changes for cutting



right- or left-hand standard screw threads from 2 to 112 per in., and for various adjustments of automatic cross feeds and automatic longitudinal feeds. No gears are removed in obtaining this range.

The lathe bed is made of close-grain cast iron reinforced by box braces cast in at short intervals. The headstock unit is equipped with a quick-acting reverse lever. A quick-acting bull-gear clamp permits engaging or disengaging the back gears. A four-step spindle cone is used on lathes of the 13-in. size and larger, and a three-step cone on the smaller sizes. The headstock spindle is made of carbon spindle steel and has a hole through its entire length.

Spindle bearings are ground and seated in phosphor-bronze boxes. The tailstock has a long bearing on the lathe bed. A set-over is provided for taper turning. The apron is provided with automatic friction cross feed and longitudinal feed. The compound rest swivels on a central stud, can be clamped and operated at any angle, and has an angular travel.

The double-friction countershaft may be arranged as a two-speed countershaft. Sixteen spindle speeds are thus provided, the high speeds being suitable for machining brass, bronze, aluminum, and similar materials.

The oiling system for the spindle bearings consists of an oil cup which feeds the lubricant down and around the inside upper half of the bronze bearing and to wicks in the lower half. An important attachment for these lathes is the draw-in collet chuck attachment used for manufacturing small precision parts.

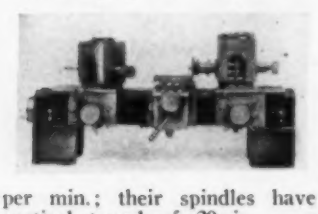
## — 137 —

### Multiple-Operations Machine, "Multimechanic"

*Simplex Manufacturing Co., Motor Coach Terminal Bldg., Spokane, Wash.* [Vol.71,p.903]

All of the various machining operations can be performed on the "Multimechanic" multiple-operations machine, according to the manufacturer. These operations—turning, drilling, boring, milling, grinding, planing, and shaping—are made possible by the great number and variety of movements.

For example, both turrets may be fed along the bed at rates ranging from ¼ to 4 in.



per min.; their spindles have vertical travel of 20 in. a rate of ¼ to 5 in. per min., and they may be swiveled through the full circle, fixed stops being provided at the 30-, 45-, 60- and 180-deg. points. Both turret indexes read in half degrees from zero to 90 deg., inclusive. The work table has feeds similar to the turrets, reciprocating speeds from 20 to 130 ft. per min., and a travel of 3 ft. The cross table measures 48x12 in. The length of the bed is 10 ft., which may be increased in increments of 2 ft. Three tool-posts are provided and two face-plates, one 8 in. and one 14 in., respectively.

The machine is manufactured in modified forms to meet the requirements of high-production manufacturing, and may be adapted to continuous mass production. The machine may be adjusted quickly.

## — 138 —

### Lathe, Brake-Drum, "Stub"

*Sundstrand Machine Tool Co., Rockford, Ill.* [Vol.71,p.909]

An easily operated high-production "Stub" lathe has been developed for turning automobile brake drums after they have been attached to the wheels. The bed of the standard "Stub" lathe has been retained, the carriage feed reversed, and the spindle lengthened, so that the

wheel and drum overhang the right-hand end of the bed. Both front and rear tool carriages may be provided.

When the rear tool carriage is furnished, it is provided with longitudinal travel. Unmounted drums may be turned readily. Any desired method may be used for supporting and driving the work. An air-operated working holding device is furnished extra. The twelve spindle speed and ten feed changes are secured through pick-off gears.

Specifications: Spindle nose diameter, 5.750 in.; hole through spindle, 1⅜ in.; range of spindle speeds, 40 to 65 r.p.m.; range of feeds, 0.005 to 0.046 in.; longitudinal travel of front carriage, 6 in.; longitudinal travel of rear carriage, 6 in.; motor recommended, 5 to 7½ hp.; distance from floor to center of spindle, 45 in.; floor space, 60x45½ in., and weight, without motor, 3,100 lb.

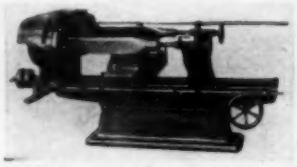
## — 139 —

### Lathe, Airplane Propeller Turning, No. 613

*Defiance Machine Works, Defiance, Ohio.* [Vol.71,p.910]

The turning of the flat winding portion of aluminum-alloy propellers or wood blade propellers and struts can be done on the No. 613 propeller turning lathe. The lengths handled are up to 5 ft. and widths or diameters up to 12 in.

The feed mechanism has five



changes of feed from ⅛ in. to ⅜ in., varying by 1/16 in. It can be started or stopped instantly in any position of the cut. At the lowest rate of feed it will turn 2½ in. per minute and at the fastest rate, 13 in. per minute.

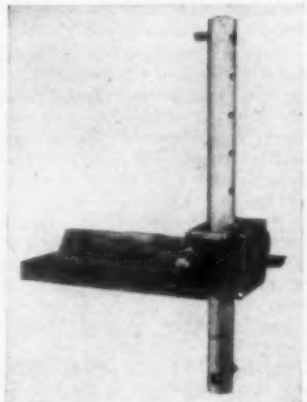
The machine as regularly furnished is supplied with one milling cutter with tracing roll to suit and with necessary oil cups and wrenches. The countershaft furnished is 2 7/16 in. x 13 ft. long and has three Hyatt roller-bearing-equipped drop hangers, with rack and pinion belt-shifting apparatus one two-step cone pulley, 4 x 6 in. x 2¼ in. face, one sectional drum for driving cutterheads, 16 x 77 in. feed pulley, 3 x 2 in., and tight and loose pulleys, 12 x 4 in., running at a speed of 600 r.p.m. The floor space occupied is 120 x 76 in. and the net weight is 4,260 pounds.

## — 140 —

### Toolholder, Combination

*Ernest J. Brisben, 14203 Orinoco Ave., Cleveland, Ohio.* [Vol.71,p.35]

This adjustable combination toolholder may be set for boring on a lathe or cutting a keyway on a shaper. The tool can be used for recessing or facing.



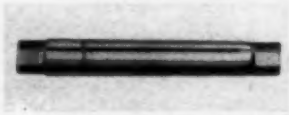
Notches in the bar permit it to be set to any length within its capacity. A draw-in taper key controlled by the round knob prevents the rectangular head from either turning or sagging.

## — 141 —

### Mandrel, Lathe

*Ampco Twist Drill Co., Jackson, Mich.* [Vol.71,p.381]

This mandrel for lathes, or other machines where two centers are used, is divided into three sections. One end may be used as a standard plug gage, accurate within 0.00005 in. The other end has an abrupt taper that can be used as a feeler gage when boring pieces to be turned upon the mandrel.



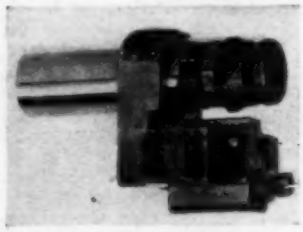
These mandrels are stocked in sizes from ¼ in. to 2 in. in proportionate overall lengths. Larger sizes can be supplied if desired.

## — 142 —

### Die Holder, Releasing

*Brown & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.419]

A releasing die holder, which is recommended for use on automatic screw machines when the thread must be held to a definite length as in threading close to a shoulder, is manufactured. An adjusting screw on the front of the holder comes in contact with the chuck guard over the nose of the spindle and thus governs the length of threading. This No. OOG holder is for use on Nos. OO



and OOG Brown & Sharpe automatic screw machines in connection with acorn dies. The die holder has a capacity of thread diameters between 1/16 and ⅛ in. and a length of thread of ⅜ inch.

## — 143 —

### Chucks, Electric, Power-Operated, 10- to 22-Inch

*Union Manufacturing Co., New Britain, Conn.* [Vol.71,p.490]

Electric power chucks, either a.c. or d.c., are furnished internally-operated for chucking

work, or externally-operated for chucking and bar work, and the pressure is controlled from 500 to 6,000 lb. The pressure can be changed by the operator. The internally-operated chuck is operated by a push-button control, the externally-operated chuck by a lever.

Chucks are of steel, with all working parts of chrome-nickel, heat-treated steel. They are furnished with either solid or reversible-top jaws as required, or for any class of special work, and are supplied in 10, 12, 15, 18, and 22-in. sizes. Motors from ½ to 1 hp. are supplied.

## — 144 —

### Lathe Feeding Device, Automatic, for Model U "Lo-Swing"

*Seneca Falls Machine Co., Seneca Falls, N. Y.* [Vol.71,p. 511]

Comparatively short cylindrical work can be handled by means of a completely automatic work-feeding device which is intended for application to the Model U "Lo-Swing" lathe. It was developed primarily for putting pistons into and removing them from the Model U.

The piston to be machined is picked up automatically from the runway by the work-feeding device and placed in the operating position in the machine. When the various operations have been performed, the piston is removed automatically by the work-feeding device from the machining position and deposited on a runway on the opposite side of the machine.

The work-feeding device is pneumatically controlled and operated by adjustable cams. It is provided with two sets of gripping fingers for handling the work. The approximate time for removing and loading automobile pistons is 3½ seconds each.

## — 145 —

### Toolholders, Offset, Side-Lock

*O. K. Tool Co., Shelton, Conn.* [Vol.71,p.512]

These offset side-lock holders are similar to the regular Series 043 and 044 sidelock holders except that the holder overhangs

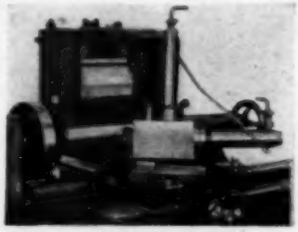
from the side of the tool-post instead of from the front. This construction permits rigidity and allows the tool to be used for multiple-tooling operations. The holder is made right- or left-hand and is of drop-forged, chrome-nickel steel, heat-treated. It is made for bit shanks from ¾ to 1 inch.

## — 146 —

### "Machinabilimeter"

*Hall Planetary Co., Philadelphia, Pa.* [Vol.71,p.528]

This device is designed to test the machinability of metals, the proper form of cutting edge, and the best cutting oil or coolant. It also shows the power used at the cutting edge and the effect of different methods of grinding and finishing tools.



Hard and soft spots are shown by the gage and recorded on the chart at the rear.

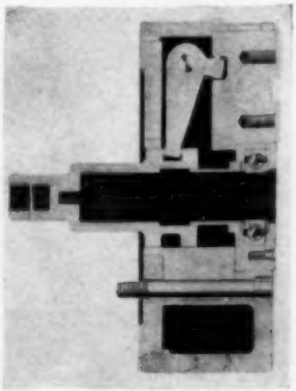
The illustration does not show a micrometer indicator that bears against the work to check the depth of cut of the tool. This indicator is connected to the cutting-tool lever.

## — 147 —

### Lathe Chuck, Air-Operated

*Hannifin Manufacturing Co., Chicago, Ill.* [Vol.71,p.532]

This improved air chuck, equipped ball bearing pilot bushings, is intended for boring op-



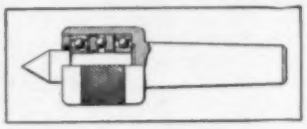
erations and similar work where rigid or non-rotating pilot bushings, mounted in the center of the chuck, were formerly used. The hole in the inner race is ground to a very close fit to accommodate the pilot and the boring tool. When the pilot moves into the hole in the bearing, the inner race remains stationary with the pilot while the outer race of the bearing revolves together with the chuck.

## — 148 —

### Center, Tailstock, Ball-Bearing, "Alive"

*Modern Machine Corporation, 285-287 N. 6th St., Brooklyn, N. Y.* [Vol.71,p.604]

The center point of the "Alive" center revolves upon precision radial ball bearings, and the thrust load is taken upon a ball thrust bearing. The



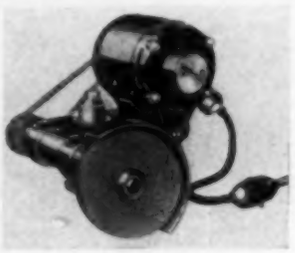
center point is made of tool steel, hardened and ground. The shank, together with the housing, is made of high-carbon steel. The center is obtainable in sizes with center numbers varying from 1 to 4 and with Morse taper numbers varying from 1 to 4. Brown & Sharpe, Jarno, and other tapers are furnished as specials, as are pipe centers, wood-turning centers, and countersink centers.

## — 149 —

### Grinder, Toolpost, No. 5

*Dumore Co., Racine, Wis.* [Vol.71,p.605]

Speeds from 4,000 to 35,000 r.p.m. are available on the No. 5 grinder through a set of quick-change pulleys. Two interchangeable quills are provided, one for external and one for internal grinding. A special quill for the use of pencil wheels can be obtained. Power is obtained through a ⅓-hp. universal motor, and ample ventilation prevents heating re-



gardless of load or speed. A positive system provides lubrication for the spindle bearings. Wheels from ½ to 5 in. in diameter are furnished. Automatic belt tension, separable toolpost, radial and vertical adjustment, and light weight are features.

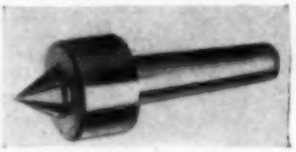
The toolpost can be mounted independently of the grinder in the lathe, planer, shaper, milling machine, or other machine tool. A convenient locknut on the right side of the frame locks the grinder rigidly in place. The No. 5 "Dumore" is capable of handling heavy grinding and yet maintains limits as close as 0.0001 inch.

## — 150 —

### Center, Ball-Bearing

*Ready Tool Co., Bridgeport, Conn.* [Vol.71,p.1065]

This ball-bearing center gives rigid and accurate support under all load and speed conditions. The two rows of balls in the New Departure double-row ball-



bearing are opposed in a preloaded condition. This angular contact bearing has solid, high-carbon, chrome-steel, inner and outer races.

The ball bearing is so mounted that the outer race rotates with the nose of the center. It requires no attention to lubrication or adjustment of any kind. The center is manufactured in the most used taper sizes, but tapers of any type or size can be made to order.

# *Milling Machines*

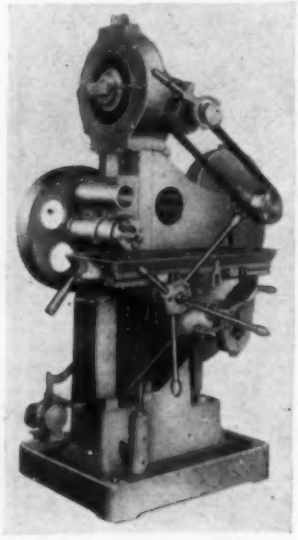
## — 151 —

### Milling Machine, High-Production

*Kent-Owens Machine Co., Toledo, Ohio.* [Vol.71,p.219]

This milling machine has a cam feed to the head in order to permit the use of a speed to suit any change in cross-section of the cut. The feed is operated continuously, or is disengaged automatically upon the completion of the cycle.

In the motor-driven machine, the motor is mounted on the back of the column. Drive to the backshaft is through a silent chain, and both the vertical feeding arrangement and spindle drive are taken by belts. The backshaft and spindle are mounted on Timken tapered roller bearings. The cam drive is through a hardened steel worm and bronze wormwheel.



Cam and follower are of hardened steel.

All controls are located conveniently. Cams to suit any particular job can be furnished. Overall dimensions of the table are 35 in. by 14 in. The maximum distance from the table to the center line of the spindle is 17½ in. The machine may be driven by motor or by a countershaft.

## — 152 —

### Milling Machine, Power-Feed, No. 2

*Kent-Owens Machine Co., Toledo, Ohio.* [Vol.71,p.566]

This improved milling machine is of the column and knee type, but has the spindle mounted in a head that can be fed vertically. The spindle drive belt from the backshaft is equipped with an idler. Both the spindle and the backshaft are mounted on Timken tapered roller bearings. Pickoff gears provide different spindle speeds. The drive can be taken either direct from the countershaft or by chain from a motor.

Power feed and hand quick return to the table are provided. The table working surface is 7 in. wide by 28 in. long and has a large trough surrounding it. Maximum distance from the spindle to the table is 17½ in. The hand feeds to the table and

head are 4¼ in. and 6½ in., respectively. The table has a 22-in. feed by crank and the saddle a 7-in. feed by crank. A 3- to 5-hp. motor is used.

Weight, 2,600 pounds.

## — 153 —

### Milling Machine, Hydraulic, No. 36, "Mil-O-Matic"

*Oesterlein Machine Co., Cincinnati, Ohio.* [Vol.71,p.689]

Automatic hydraulic operation is the feature of the No. 36 "Mil-O-Matic" bed-type milling machine. The machine may be equipped with either a plain reciprocating table having a 21 x 48-in. working surface, affording a feed of 36 inches, or with an automatic indexing table of 14 x 24-in. working surface, mounted on a slide that has a 24-in. feed. On the indexing-type machine, the table makes a half turn at the end of its return stroke and then advances again to the cut. The machine is available in single-spindle, duplex, vertical, and multiple-spindle models, each in several standard bed lengths and table lengths. Special heads may be applied. Normal range of the spindle speeds is from 20 to 242 r.p.m., and the feeds range from 0 to 30 in. per minute.

The spindle head is an entirely

self-contained unit. It carries its own motor; starting, stopping, and reversing mechanism and control lever; pickoff gears for determining speed; and all adjustable controls. An 8 in. in-and-out adjustment for the spindle and a 14 in. vertical adjustment for the spindle-head are provided.

The base of the column, on which the spindle-head is mounted, has a compartment into which is mounted a direct-connected, motor-driven Oilgear unit for furnishing the table feed.

In connection with Oilgear equipment, as applied to the Mil-O-Matic, a cam plate is used for operating the lever that controls the pumping mechanism and governs the rate and direction of motion of the table. Either a constant, varying, or intermittent feed is available, depending only on the contour of the cam in use.

Under ordinary operating conditions, springs operate a "load and fire" device and keep the control lever on one side or other of neutral. The table therefore continues to reciprocate and index automatically. However, an interference device is provided.

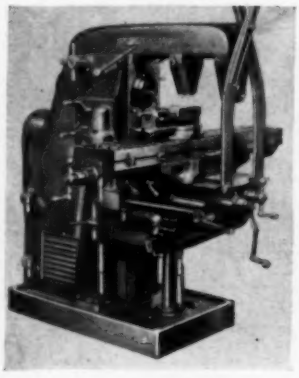
A 10-hp., 1,740 r.p.m. motor is required to drive each standard spindle. A 5-hp., 1,200 r.p.m. motor is required for driving the Oilgear unit, and a ½-hp. built-in motor, is provided with the pump. The complete single spindle machine, when furnished with the tie piece and outer arbor support, weighs 14,000 pounds.

## — 154 —

### Milling Machine, Improved, Type M

*Cincinnati Milling Machine Co., Cincinnati, Ohio.* [Vol.71, p.948]

The type M milling machines, Nos. 1 and 2 in. plain, universal, and vertical styles, are now equipped with power quick traverse in three directions. The rates are 100 in., longitudinal;



66 in., cross, and 33 in., vertical. The power quick traverse lever, which is conveniently located at the left front side of the knee, has positions as follows: upward, power quick traverse; horizontal, neutral, and downward, feed.

Twelve feeds are available, that is ¾ to 30 in., longitudinal; ¼ to 20 in., cross, and ¼ to 10 in., vertical, in both directions. Control of any one of the three feeds from the rear of the table can be obtained by the use of the rear reversing lever, a duplication of the front lever.

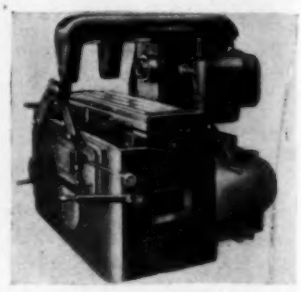
## — 155 —

### Milling Machines, Plain and Duplex, "Hydromatic," No. 3-24

*Cincinnati Milling Machine Co., Cincinnati, Ohio.* [Vol.71, p.1057]

These machines are built with hydraulic table feed. The principal units of the plain machine are the standard No. 3 bed table unit with a 24-in. table travel, the standard No. 3 headstock unit, the standard No. 3 spindle carrier with overarm and two arbor supports, the spindle reverse and clutch unit, and the hydraulic feed unit.

The work table is mounted on a solid, semi-steel bed, having unusually long bearings. The spindle carrier unit and the spindle reverse and clutch unit



comprise the entire spindle drive. Eight spindle speeds are available, ranging from 27 to 200 r.p.m. The spindle is carried in a heat-treated 7-in. steel quill, which has a cross adjustment of 4½ inches.

The locked hydraulic feed unit consists of a variable-displacement metering pump, a small simple booster pump, a gear pump, and the necessary control valves. Any desired feed between 0 and 40 in. per minute can be obtained.

Automatic variable feed to suit a varying width or depth of cut can be obtained through the use of a special variable-feed attachment. A positive stop and delayed trip attachment, for feeding to a definite depth and dwelling to clean up the cut, is supplied on special order.

All operating levers are located conveniently at the normal operating position.

Automatic control of all table movements, including the automatic intermittent feeds of the table, are obtained by dogs.

One-shot lubrication is provided for the chain-drive unit of the hydraulic feed mechanism, the clutch, vertical drive, the bearing in the reverse box, the feed trip plunger, and the table ways.

The machine has a working table with over-all dimensions of 49x12 in., and with a total travel of 24 in. The net weight of the No. 3-24 plain machine is 5,500 lb., and of the duplex machine, 6,500 lb. These machines can be supplied with a 30-in. table travel.

## — 156 —

### Milling Machine, Vertical, Bridge-Type, "Mil-Waukee-Mil"

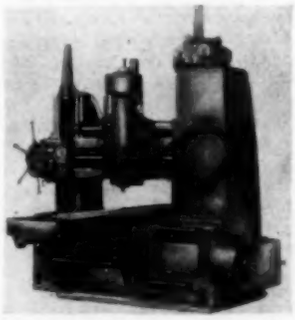
*Kearney & Trecker Corporation, Milwaukee, Wis.* [Vol. 71,p.498]

This bridge-type miller is designed to do face milling, die-sinking, routing, profile milling, and jig and fixture work. It is

supplied with a 22-in. wide "Simplex" bed, which can be furnished in any length from 3 to 11 ft. The maximum width of work that will pass through the housings is 46 inches.

The bridge is raised or lowered by power at the rate of 25 in. per min., and can be locked. The saddle can be traversed a distance of 24 in. by power feed or by power rapid traverse. The spindle ram is provided with a 7-in. power down feed, or it can be run up and down with either slow or quick hand movement.

The heavy upright housing is bolted to the bed and the bridge fits into ways on this upright. There is a secondary upright to carry the front end of the bridge. The bridge can be lowered to a minimum distance of 11 in. from the top of the table, or raised to a maxi-



mum distance of 28 in. above it. Safety trips are provided.

Power rapid traverse of the saddle along the bridge is fixed at 100 in. per min. It is possible to engage both the saddle cross feed and the milling table feed at the same time for diagonal milling. Trip dogs stop the feed or power rapid traverse of the saddle at any desired point.

The feed may be either by pick-off gears or a quick-change gearbox, with a range of either ¼ to 20 in. per min. or 1 to 40 in. per min. The spindle drive may be through pick-off gears or a quick-change gearbox. With pick-off gears, the spindle speeds may be 15 to 150; 20 to 200; 30 to 300, or 50 to 500 r.p.m. With the quick-change gearbox, the speeds provided are 15 to 300, in 18 changes. By shifting a pair of change gears, a second series of 18 speeds is available from 30 to 600 rev. per minute.

The spindle ram is fitted to vertical ways on the saddle, which, in turn, is fitted to horizontal ways on the bridge. The power down feed rates for the ram are one-fourth of the feed rates of the milling machine. This provides the fine feeds necessary for boring operations. The spindle ram can be lowered or fed down to a minimum distance of 3¼ in. from the top of the table, or raised to a maximum distance of 26¾ inches.

The spindle and its drive roll on anti-friction bearings.

## — 157 —

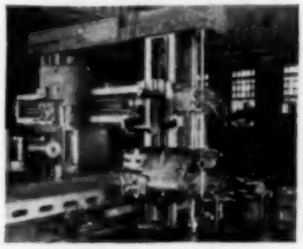
### Milling Machine, Planer-Type, 72-Inch

*Wm. Sellers & Co., Inc., Philadelphia, Pa.* [Vol.71,p. 375.]

This machine, designed and built to machine centrifugal pump casings of 6, 7, or 8 stages, is equipped with two standard milling heads to make the machine adaptable for a general run of work.

The machine has a rail milling head, a right-hand side milling head, a grinding head on the rail, and a boring head carried on an extended apron. Each milling head has an individual motor drive through short shafts and spur gears. Individual motors allow different milling speeds on each head. Each head has 16 speeds changed by sliding gears and clutches, giving a speed range of 15 to 300 r.p.m. The boring head utilizes a ground worm and worm wheel to revolve the horizontal boring spindle. It has a range of speed from 1 to 20 rev. per minute.

Spindle and shafts are of chrome-nickel steel. The grinding head contains a 12-in. wheel mounted on a horizontal spindle



and driven by a 5-hp. motor through Texrope drive. Both motor and spindle are mounted on a slide for fine vertical adjustment. The cross-rail is of the extended back type.

The table is of box construction and is carried on one flat and one double V-way. Holding-down shoes are provided. Drive is by a spiral gear. A change gearbox and rheostat provide the necessary feed range and rapid traverse. The bed, of the closed-top type, is heavily reinforced, particularly between the uprights.

All motors are controlled by push buttons. The control of the machine is completely interlocked. Safety clutches are added as an additional precaution against abuse.

## — 158 —

### Milling Machine, Universal, Tool

*Index Machinery Corporation, 49th Ave., Cincinnati, Ohio.* [Vol.71,p.302]

Especially adapted to milling punches and tools in one chucking, the Deckel universal tool milling machine, manufactured

by Frederick Deckel, Muenchen, Germany, is being marketed in the U. S. by the above agent. The cutter head is adjustable and so is the dividing head. These movements make possible such operations as milling, drilling, boring, and slotting without moving the piece from the chuck.

The working surface of the table is 18 x 6½ in., the longitudinal table feed being 9½ in., and the vertical table feed, 8 in. The horizontal feed of the spindle head is 5 in. The diameter of the spindle hole is ⅝ in. Four speeds in either direction are available, the range being from 105 to 1,070 r.p.m. Power required equals ¾ hp. A tailstock for long and slender parts is provided.

Standard equipment includes a vertical table, a dividing head, three dividing plates, a knee for the dividing head, one three-jaw chuck, two collets, ⅜ and ½ in., one countershaft, and necessary wrenches. The machine weighs 790 pounds.

## — 159 —

### Milling Machines, Plain, Universal, and Vertical, No. 3

*Cincinnati Milling Machine Co., Cincinnati, Ohio.* [Vol.71, p.603]

The No. 3 knee and column type machine is made in plain, universal, and vertical models, and with belt or inclosed chain motor drive. One feature is the automatic power shift for the spindle speeds as well as the table feeds, controllable from either the front or the rear of the machine.

A simple mechanism within the machine positions the gears to obtain the feed or speed desired. Three different series of feeds, known as the low, ¼ to 10 in., standard, ½ to 20 in., and high, ¾ to 30 in., can be supplied.

Every movement has a power rapid traverse, in addition to the power feed, operable from either the front or rear. Traverse rates are, longitudinal, 100 in., cross, 50 in., and vertical, 50 in. per minute.

Anti-friction bearings are used throughout the spindle drive. The Cincinnati double mounting of anti-friction bearings, both front and rear on the spindle with a floating rear bearing, is used. Substantial gears slide on heat-treated, splined shafts.

The rectangular overarm has been increased in size. The two arbor supports are of aluminum and automatic lubrication is pro-

vided for the bearing collars. The supports are 50 per cent lighter. There are no universal joints. The vertical driveshaft is inclosed. The general proportions of the knee, column, and other parts have been increased in dimensions.

The table for all three machines, plain, universal and vertical, has a working surface and an over-all size of 62½ x 15 in. with 3⅛-in. T-slots. The table on the No. 3 universal swivels 45 deg. The longitudinal feed is 34 in. on all three machines. The cross feed is 12 in. on the plain and universal, and 16 in. on the vertical machine. The vertical feed is 20 in. on the plain, 19 in. on the universal, and 12½ in. on the vertical machine. A 7½-hp. motor, 1,750 r.p.m., is recommended. The machines weigh 6,900, 7,200 and 7,400 lb. The No. 3 vertical has the same features as the plain machine, but has an adjustable head travel of 6 in., and can be supplied with either hand or power feed to the head. The maximum distance from spindle nose to the table is 22 in., and the throat distance from the center of the spindle to the column is 18 inches.

## — 160 —

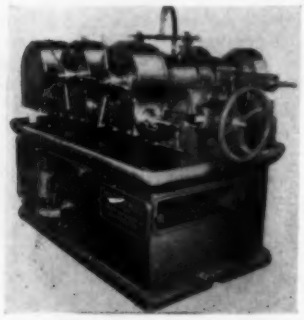
### Milling Machine, Cam, Double-Spindle, No. 11D

*Producto Machine Co., Bridgeport, Conn.* [Vol.71,p.218]

Cams in any size up to 8 in. in diameter and 4 in. in width can be milled simultaneously on this cam miller. The machine is mounted on the standard-type cabinet base. The bed is bolted

securely to the base and carries a dove-tail slide, which in turn carries a one-piece, double, cutter-spindle head. Two separate castings are employed for the work spindle heads. Work is located properly in relation to the cutters by small templates. These templates slide out of the way automatically.

Movement of the cutter-spindle heads is controlled by a master cam. Proper tension is



applied by a spring. Flywheels on the cutter spindles provide smooth cutting action. Large diameter cutter and work spindles are employed.

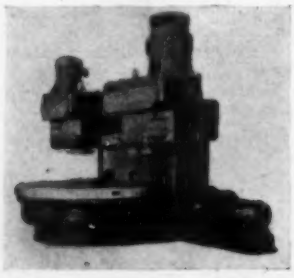
Another feature of the machine is the provision of means for milling the master cam from a model of the work. Cutter spindle heads can be adjusted sideways through 4 in. to provide for different widths of work. Work and cutter spindles are mounted in Timken roller bearings. A 7½-hp. motor is used to drive the machine. Net weight is 6,000 pounds.

## — 161 —

### Milling Machine, Continuous, Rotary, 72-Inch

*Putnam Machine Works, Div. of Manning, Maxwell & Moore, Inc., Fitchburg, Mass.* [Vol. 71,p.477]

Designed for plants having large numbers of duplicate parts to be machined, this machine represents an application of the Putnam unit milling head to a



rotary miller. It has a two-spindle head for roughing and a single spindle head for finishing, both mounted on a rail and so arranged that the horizontal distance from the spindles to the center of the rotary table may be varied. Each head is equipped with a constant-speed motor, giving a single spindle speed, which may be varied by change gears.

The rotary table has angular bearings and two flat bearings, and is driven by a wormwheel. Table feed is by a separate motor, and may be varied to meet requirements by means of change gears. When required, the milling heads can be furnished with a multiplicity of feeds, both for moving the quill in and out of the head, and for feeding the head along the rail. The motor is located on the head itself, and roller bearings and heat-treated helical gears are used in the construction.

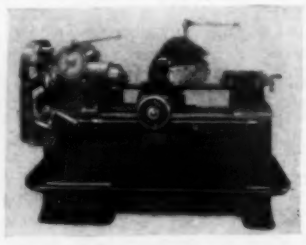
Weight, 25,000 pounds.

## — 162 —

### Milling Machine, Thread, Heavy-Duty

*Lees-Bradner Co., Cleveland, Ohio.* [Vol.71,p.526]

This machine has a two-speed cutter head with a reduction in the head, a quick-change lever permitting a roughing cut and



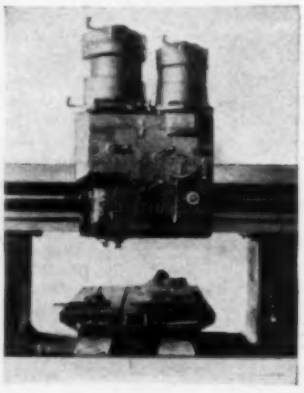
returning for a finishing cut at one setting. A quick-change cutter reverse mechanism is located between the drive shaft and the cutter head.

## — 163 —

### Milling Head, 4¾-Inch Unit

*Putnam Machine Works, Division of Manning, Maxwell & Moore, Inc., Fitchburg, Mass.* [Vol.71,p.72]

This 4¾-in. unit milling head, which can be applied to all planer-type and rotary milling machines in either a vertical or horizontal position, is a self-contained milling spindle saddle, having all mechanisms required for rotating the spindle at a



number of speeds, for fast traversing the head itself, and for moving the spindle quill in and out. It may be designed with a large number of spindle speeds and feeds, or with a limited number. The unit head is of box construction with an oil-tight milling spindle saddle having two motors mounted upon it.

The spindle driving gearing is of the helical type, mounted on shafts running in Timken tapered roller bearings. The unit head may be clamped in its guide and the spindle quill may also be clamped in position. Both the head and the spindle quill have hand adjustments, as well as power feed and fast traverse. The head feeds range from 1 to 12 in. per minute.

Motors may be furnished with two types of controlling apparatus, manual or automatic control. The spindle has a No. 13 B. & S. tapered hole. The spindle quill has a 10-in. travel. Quill feeds are from 0.4 to 4.8 in. per min. The spindle is driven by a 7½-hp., multi-speed, a.c. motor. Speeds are 600, 900, 1,200, and 1,800 r.p.m. A d.c. motor may be furnished with the speed adjustable from 650 to 1,950 rev. per minute.

# *Planers and Shapers*

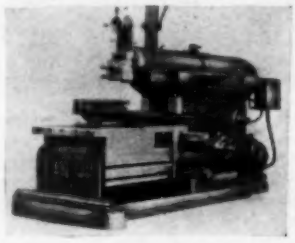
## — 164 —

### Shaper, 36-Inch, "Super-Dreadnaught"

*Ohio Machine Tool Co., Kenton, Ohio.* [Vol.71,p.523]

Although built particularly for large work which must be clamped down, the 36-in. "Super-Dreadnaught" shaper can also be used for small work. Regular features include automatic forced-feed lubrication, instantaneous feed, quick-change speed box, clutch, and brake micrometer collar on the head.

The regular equipment includes a double or single screw



vise, tables, a herringbone bull-gear and pinion, a steel crank-arm, table support and jack, spoked handwheel and head, double-wall, box-section ram, heavy-ribbed column with ram bearing 56 x 15 in., large head on ram, with 13 in. diam. swivel, and base of the reinforced, box-section type. Extra equipment includes automatic power downfeed to the head, rapid power traverse, power elevation, revolving table 30 in. long by 20 in. wide, and tilting top on table, 30 in. long by 20 in. wide.

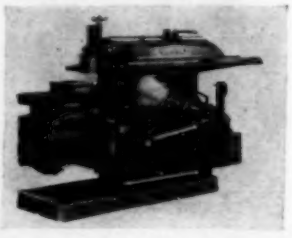
The regular box table has a top surface of 36 x 30 in., including the saddle.

## — 165 —

### Shapers, Heavy-Duty, 25- and 16-Inch

*Cincinnati Shaper Co., Cincinnati, Ohio.* [Vol.71,p.525]

These two shapers, a 24-in. heavy-duty shaper, and a 16-in. heavy-duty shaper, have a built-in power rapid traverse. The 16-in. shaper is equipped with the "Cincinnati" universal table. Cutting speeds have been increased. A combination tool tray and cross-rail guard are



features, as well as Timken thrust bearings on each end of the cross-fed screw. Another feature of this shaper is the construction of the ram bearings, which extend to the end of the ram and reduce overhang from the cutting tool to the ram bearing by 2¾ in. Heavy, accurate cutting, without chatter, is claimed for the machine, which has the highest number of strokes per minute of any shaper built by the company.

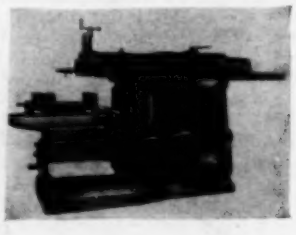
These features are also built into the 24-in. heavy-duty shaper, which is equipped with a full box table with a power rapid traverse, as in the smaller machine.

## — 166 —

### Shaper, Manufacturing-Type, 36-Inch

*Gould & Eberhardt, Irvington, N. J.* [Vol.71,p.527]

A 36-in. manufacturing-type shaper embodies the same appointments as found in the other



sizes of this line. Rapid power traverse may be operated at all times opposite the feed as set. Dual control is furnished for operating the hand feed on the table and at the rail. Improved design of the work slide reduces the table deflection and affords more bearing surface, while providing a more accurate guide. A positive locking device for the table support is applied. A double crank gear transmission with all heat-treated gears is employed. A built-in motor is coupled directly to the transmission drive shaft. A circulatory pressure lubrication system to all important parts, has been provided.

## — 167 —

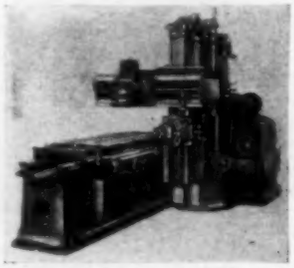
### Shaper-Planer, Hydraulic

*Rockford Machine Tool Co., Rockford, Ill.* [Vol.71,p.681]

The feature of this shaper-planer is that both table and feeds are operated by hydraulic power. An Oilgear pump operates a hydraulic cylinder mounted close under the table. The piston of this cylinder is directly connected to the table and exerts a maximum pull of 10,800 lb. Any desired cutting speed up to 75 ft. per min. is available. Ratio of cutting speed to return is one to three.

Some of the features of this machine are: Increased work capacity; greater power, strength, and rigidity; finger-tip control; exact adjustment of speeds and feeds to work requirements; speedier operation; higher table-return ratio; simplicity; longer life; accuracy easily maintained, and pressure lubrication of bearings by filtered oil. Hydraulic power for the feeds is provided by a separate pump.

Specifications: Stroke of table, standard machine, 43 in.; maximum distance, table to



cross-rail, 24 in.; number of feeds, horizontal and vertical, 20; feed horizontal, 0.010 to 0.200 in.; feed, vertical, 0.004 to 0.080 in.; horizontal travel of tool, 26 in.; vertical travel of tool, 7½ in.; floor space, standard machine, (42 in.), 58⅝ x 119 in.; maximum height, 101 in.; and motor, 7½ horsepower.

Both rail and side heads are of the graduated swiveling type. The rail head has horizontal and vertical power feeds in both directions and rapid traverse to right or left. The side head has vertical power feed and hand horizontal feed. This shaper-planer is converted quickly into a surface grinder. Provision is made for the complete protection of all finished surfaces. Feed takes place at both ends of the stroke.

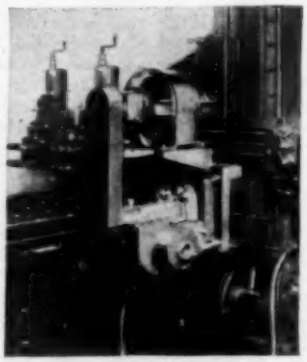
Extra equipment can be furnished as follows: Second rail head, side head, circular planing head, grinding head, two-piece vise (stationary jaws), standard shaper vise, boom crane, shoe and wedge chuck, driving-rod-brass planing fixture, and index centers.

## — 168 —

### Milling Head for Planers

*Adams Co., Dubuque, Iowa.* [Vol.71,p.564]

A re-designed milling machine head for planers is now supplied completely Timken bearing equipped. Both the main spindle and the worm shaft rotate on Timken tapered roller bearings and the drive is by means of a hardened steel worm engaging



a phosphor-bronze wormwheel on the spindle. The heads are made in three sizes.

The planer head is supplied ordinarily with a saddle planed to fit the individual planer rail, the head being so mounted on the saddle that it can be swiveled for horizontal, vertical, or angular milling, as the job may require.

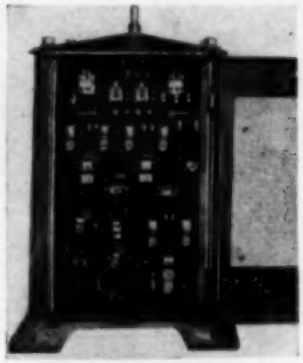
The driving motor is of 25 hp., giving speeds from 250 to 500 r.p.m. by varying the gear combinations in the box. This unit may be applied to practically any direct-motor-driven planer.

## — 169 —

### Planer Control Apparatus

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.457]

All automatic operations of a planer to be governed from a pendant push-button station can be controlled by a magnetic controller and a push-button station, designated CR-4602-L-5 and CR-2940-BC-14, respectively. The panel, is of standard design with an added section on which are mounted the relaying contactors governed by the station.



This extra section may be added to standard pedestal-type magnetic controllers now in service.

The push-button station has four buttons: "Automatic," "out," "return," and "stop." The "start" button is located at the controller itself, but, after pressing the stop button at the pendant station, operation may be resumed by pressing the automatic button. The push-button station is approximately 2 in. wide, 6 in. high and 2¼ in. deep.

## — 170 —

### Shaper Attachment, Power Rapid Traverse

*American Tool Works Co., Cincinnati, Ohio.* [Vol.71,p.508]

This traverse is a self-contained, motor-driven unit, entirely independent of the operating mechanism of the shaper. Drive is by a small motor mounted on the "off" side of the column and connected to the

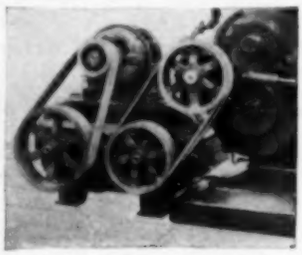
crossfeed screw by a worm and worm gear. A forward and reverse push-button control starts and stops the traverse. A power-feed lever controls an automatic knockout for the power traverse, preventing the latter from becoming engaged while the power feed is functioning.

## — 171 —

### Transmission, Variable-Speed

*Morton Manufacturing Co., East Broadway & Hoyt St., Muskegon Heights, Mich.* [Vol.71,p.1061]

This variable-speed transmission has an unlimited number of speed changes, and is quiet and powerful. It is possible to get a 3 to 1 speed range. All speed changes may be made while the machine is in motion and the cutting speed of the machine can be changed by inches if desired. The cutting speed or cutting feed per minute is indicated on a speed indicator. The changes are accomplished by a hand-



wheel within easy reach of the operator. A Reeves drive unit is used as part of this transmission. This drive is especially adapted to Morton high-duty draw-cut shapers.

## — 172 —

### Transmission, Reversing

*Morton Manufacturing Co., East Broadway & Hoyt St., Muskegon Heights, Mich.* [Vol.71,p.1063]

This direct-connected reversing drive unit is designed for application to the Morton stationary keyway cutters, which

are built with 18-, 24-, 38-, and 48-in. cutting strokes, respectively. It is of box-type construction with powerful multiple-disk clutches geared to give a 2 to 1 quick return ratio.

This reversing drive unit is direct-connected to the machine by means of a flexible coupling, and is powerful, quiet running, and positive in its reversal.

## — 173 —

### Planer Jacks, Style 1945

*Alliance Tool Co., Alliance, Ohio.* [Vol.71,p.790]

Jacks for use on planers, milling machines, and shapers, known as Style 1945, have been placed on the market. Edges

and ends are finished by grinding and with the screws removed, they make solid blocks that will fit in a great many cases. They are made in five sizes, 2, 3, 4, 5, and 6 inches.

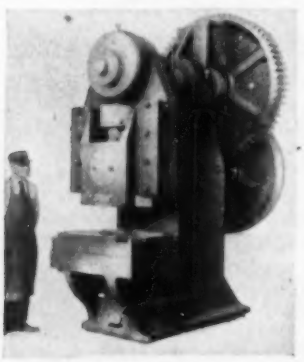
# Presses

## — 174 —

### Presses, Punch, Improved

*Williams, White & Co., Moline, Ill.* [Vol.71,p.186]

This is an improved series of punch presses for use in punching, blanking, piercing, and drawing. The frame is a one-piece, semi-steel casting of box section. Main bearings are bronze bushed, and the shaft is a hammered steel forging. An automatic-stop, steel-jaw clutch



with treadle control is furnished. Each size of machine is single-geared.

The machine shown, the No. 66, was designed to punch a blank 10¼ in. in diam. through ¾-in., high-carbon steel. The bolster plate measures 24 in., front to back, and 36 in. in width. This machine is built with a 3-in. stroke, but, by means of another eccentric, a 6-in. stroke can be obtained. The distance between bed and slide, stroke up and adjustment up, measures 16 in. Adjustment of 3 in. is provided by a screw on the connecting rod. The machine weighs 25,000 lb., and is capable of exerting a pressure of 200 tons at the dies.

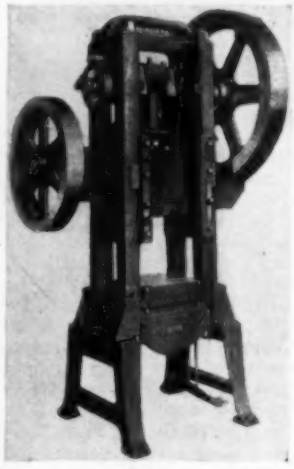
## — 175 —

### Presses, Power, Single-Crank, Nos. 54 and 56

*Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, N. Y.* [Vol.71,p.341]

To meet the present demand for a small-size press having great rigidity and strength, the Nos. 54 and 56 single-crank power presses of the four-piece steel tierod frame construction can be furnished in belt- or motor-driven types in either plain or single backgeared models.

The presses have a rated capacity of 32 and 56 tons, respectively. Strip stock of considerable width can be fed from right to left through the openings in the uprights.

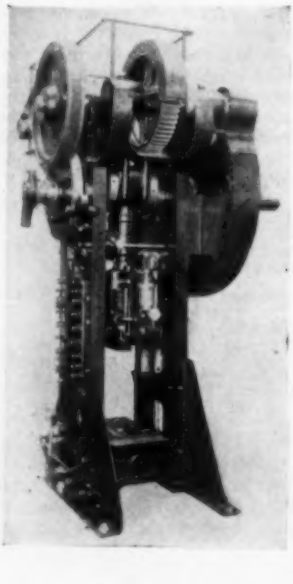


## — 176 —

### Press, Eccentric, Regulated-Pressure

*Henry Pels & Co., Inc., 90 West St., New York, N. Y.* [Vol.71,p.419]

This eccentric press has a hydraulic pressure-regulating device that will release the pressure automatically as soon as the permissible maximum is reached, which on the machine illustrated is 330 tons. The compression fluid escapes into the overflow tanks, the plunger continues its movement without forcing the ram down any further, and, upon its return stroke, draws the compression fluid back into the cylinder by suction. The machine was first designed for straightening automobile crankshafts, but may be used for a wide range of forging, trimming, forming, coining, and similar operations.



This machine can continue work without interruption even after the overload protective device has operated. The manufacturer claims complete protection for the frame and all moving parts by the use of this device, in addition to the adjustability of the machine to operate at a predetermined pressure.

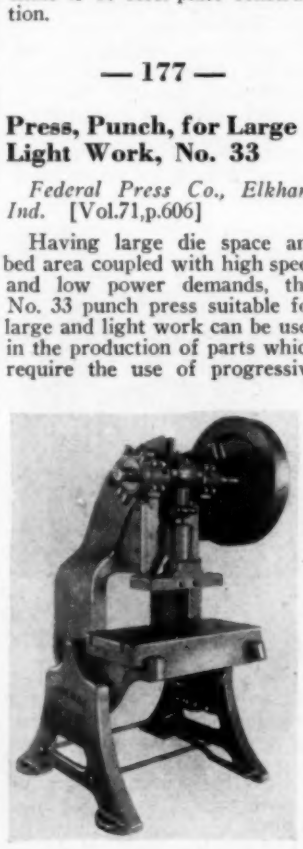
The machine illustrated has a bed 20x38 in., a stroke of 12 in., a slide adjustment of 3 in., and a distance of 26 in. between the uprights. The frame of the machine is of steel-plate construction.

## — 177 —

### Press, Punch, for Large Light Work, No. 33

*Federal Press Co., Elkhart, Ind.* [Vol.71,p.606]

Having large die space and bed area coupled with high speed and low power demands, this No. 33 punch press suitable for large and light work can be used in the production of parts which require the use of progressive



dies. It has an opening in the bed which permits the dropping through of parts or scrap from extremely long progressive dies.

The pressure of the ram near the bottom of the stroke is about 26 tons, the standard stroke being 1 in., and the maximum stroke at extra cost, 1½ in. The adjustment down from the top does not exceed 2 in. and the size of the square hole provided for round or square punch shanks is about 1⅞ in. The ram face from right to left is 18 in. and from front to back 7½ in. Die space, bed to slide, stroke down, adjustment up, is 9¼ in. The size of the oblong opening in the bed is 21x6 in., the opening through the back is 20½ in., and the bed is inclinable from the upright to 40 deg. Weight, 3,100 lb. Over-all floor space required, 35x44½ inches.

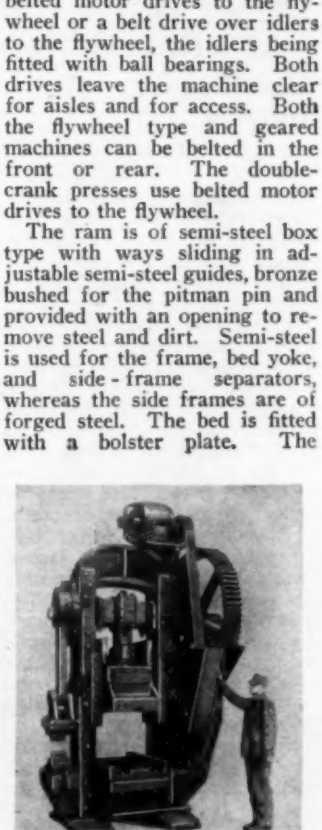
## — 178 —

### Press, Steelside

*Chambersburg Engineering Co., Chambersburg, Pa.* [Vol. 71,p.752]

Single and double-crank steel-side presses manufactured in capacities from 60 to 500 and 80 to 500 tons, respectively, have been placed on the market. The single-crank press in the 60- to 150-ton sizes is of the flywheel type with either belt or belted motor drive with a friction-slip flywheel. Geared types from 60- to 500-ton capacities have belted motor drives to the flywheel or a belt drive over idlers to the flywheel, the idlers being fitted with ball bearings. Both drives leave the machine clear for aisles and for access. Both the flywheel type and geared machines can be belted in the front or rear. The double-crank presses use belted motor drives to the flywheel.

The ram is of semi-steel box type with ways sliding in adjustable semi-steel guides, bronze bushed for the pitman pin and provided with an opening to remove steel and dirt. Semi-steel is used for the frame, bed yoke, and side-frame separators, whereas the side frames are of forged steel. The bed is fitted with a bolster plate. The



crankshaft is of forged steel. All gears are of cut steel and auxiliary gear shafts run in roller bearings. A sprue cutter is standard unless otherwise specified.

The double-crank steel-slide presses embody the same features as employed in the single-crank presses. Although sprue cutters are not standard, they can be supplied. Two widths between frames are offered as standard.

The maximum stroke on the single-crank press is 6 in. for the smallest size, and for the largest size, 22 in. The left to right bolster distance in the smallest size is 15 in. and for largest size, 41 in., and the front to back distance for the smallest size is 19 in., and for the largest size, 44 in. The distance between frames in the smallest size is 18 in. and the largest, 44 in. and from the bed

to the ram, stroke and adjustment up, 20½ and 39 in., respectively.

For the double-crank press, the narrow width between frames of the 80-ton model is 46 in. and for the largest size, 84 inches.

## — 179 —

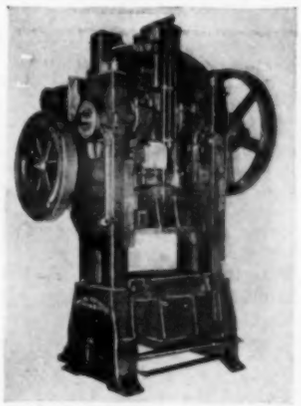
### Press, Double-Crank, No. 5

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.905]

Another unit in the series of redesigned presses is the No. 5 double-crank press. The same principles of design as in other presses made by the company are in this machine in the model shown. An eccentric shaft is used to drive the slides, but crank construction may also be obtained.

Pads are provided on the back of the press for mounting a motor, but a belt-driven flywheel can also be obtained. The press is single geared with a ratio of 7 to 1, and a three-jaw clutch controls the movement of the eccentric or crankshaft. Control is by a treadle across the front of the press with a guard above it for safety. On the outboard end of the crankshaft is a band brake which can be adjusted by hand from the floor. Crankshaft bearings and crankpins are bronze-bushed, but the driveshaft is mounted on Timken bearings. At the flywheel end, two bearings are mounted opposed in a unit carrier, and at the pinion end there is a Timken bearing each side of the pinion. Housings are cast integral with a bridge.

In the machine shown, the width between uprights is 44 in. and between gibs, 39½ in. The slide itself measures 21 in. front to back and 39 in. wide, while the bolster measures 30x42 in. The opening in the bed is 15x28 in. and the die space, 16½ in.



from bed to slide, with stroke down and adjustment up. The stroke of the press is 8 in., with an adjustment of 3½ in. As a special feature, T-slots are provided in the bolster, which is 4½ in. thick. The speed of the press is 35 strokes per minute.

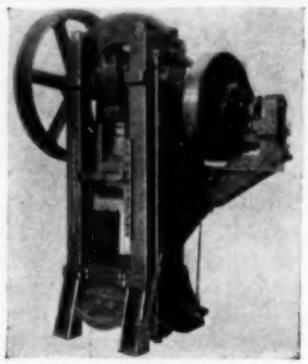
## — 180 —

### Presses, Crank

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.906]

These crank presses are available in capacities from 40 to 400 tons, and the crankshaft diameters are from 3 to 9 in. by half-inch steps. The No. 407 size, capacity 175 tons, is illustrated. It incorporates a hand-operated friction clutch.

Steel tie-rod construction is used on all sizes. Castings are



made of semi-steel. Timken bearings are used on the drive shaft, and bronze-bushed bearings at all other locations. Gears and pinions are cut from steel, with the exception of the large crankshaft gear, which is made of semi-steel. The crankshaft is a heat-treated steel forging. The connection piece is of semi-steel and, in the larger sizes, the buttress-thread screw made of heat-treated steel engages a soft steel sleeve. In the smaller sizes, the screw engages a thread cut directly in the casting.

With the friction-clutch drive, a compensating shoe-type brake is employed independent of the clutch. By means of a cam on the end of the crankshaft, the clutch is thrown out and the brake applied automatically at the top of the stroke. Final pressure on the brake shoes is by toggle action. The brake drum is mounted integral with the clutch flywheel.

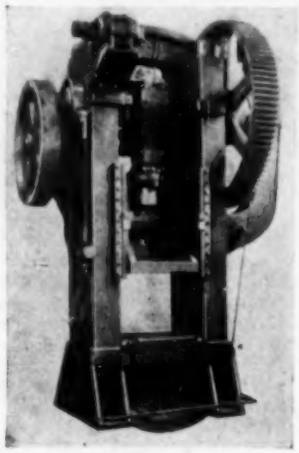
## — 181 —

### Presses, Eccentric

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.906]

These eccentric presses are available in sizes from 40 to 400 tons, and the crankshaft diameters vary from 3 to 9 in. by half-inch steps. The No. 409 size illustrated has a capacity of 400 tons, and is equipped with a jaw clutch. The constructional features are same as for the crank press illustrated just preceding this one.

With jaw clutch drive, a band brake is used on the drum, mounted on the end of the crankshaft. This brake may be



adjusted from the floor. The press exhibited was designed for blanking heavy stock, but it can also be obtained with crank drive.

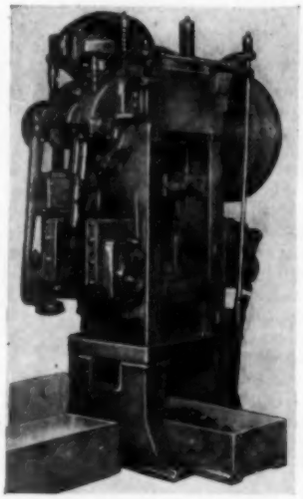
## — 182 —

### Press, High-Production, No. 630

*E. W. Bliss Co., 53rd St. & Second Ave., Brooklyn, N. Y.* [Vol.71,p.911]

Certain improvements enable the No. 630 high-production press to be operated at 400 strokes per minute. This speed can be maintained in the quantity blanking and forming of stampings from 0.010-in. brass and 0.014-in. steel coil stock. To obtain maximum life of the dies on high production, the machine has been built 50 per cent stronger than normal.

Improvements have also been made in the high-production, double-roll feed. A scrap cutter is generally used with this machine. Other features include



the hardened, chrome-nickel steel, rolling key clutch with backing pawl, Manzell force-feed lubricator with separate piping to all main bearings, ample counter-balancing springs on the slide, and a Texrope drive on the top of the press.

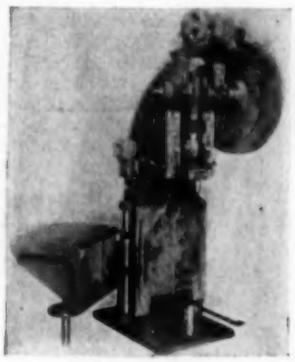
## — 183 —

### Press, Bed, Adjustable, No. 24R

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.1022]

A direct-drive, combination, adjustable bed and horning press has been developed. Direct-motor drive is shown, but belt drive is also available. In either case, a pin clutch with three locking points is used in connection with a reversible clutch bolt. An adjustable band brake is provided on the crankshaft.

The frame of the press is a one-piece casting of semi-steel.



Semi-steel is also used for the flywheel gear, the connection parts, and the bed. Heat-treated steel is used for the crankshaft and the connection screw. The flywheel measures 36x5½ in. and weighs 750 lb. It revolves at 100 r.p.m. The crankshaft diameter is 3 in. at the bearings and 4½ in. at the crankpin.

The slide measures 8½x7½ in. has lugs on the sides for attaching dies. Normal stroke is 3 in., and adjustment, 3 in. With the adjustable bed the die space may be varied from 5½ in. minimum to 20 in. maximum. A bed area of 20x25½ in. is available, the bolster being 2 in. thick. The unit has a 10-in. throat and measures 8 in. between the gibs. Horn hole is 4½ in. in diameter and is 20 in. deep.

Weight, without dies, 6,800 pounds.

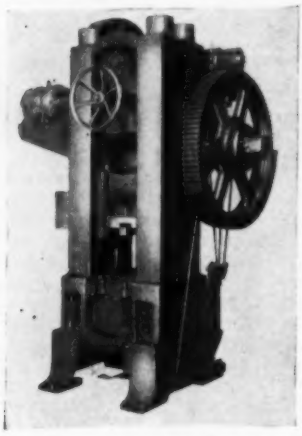
## — 184 —

### Press, Embossing, Knuckle-Joint, 250-Ton

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.1020]

Another machine in the recently redesigned series of presses made by this company is the No. 803 "New Rockford" knuckle-joint embossing press. The castings are of semi-steel keyed together and held by four heavy steel tie rods. Timken bearings are standard on the drive shaft. Bronze-bushed bearings are used on the crankshaft, however. Knuckle bearings are also bronze-bushed and are of special design to obtain a large bearing surface.

The press is driven by a 10-



hp. motor mounted on a bracket. The press is single geared, and with a flywheel speed of 270 r.p.m., 36 strokes per min. are obtained. A standard three-jaw clutch provided with three locking pins to prevent rebound is featured, and control is by means of a treadle.

The machine measures 18 in. between uprights, 14 in. between gibs. The bolster plate measures 17x17 in., while the slide measures 10x13½ in. Bolster thickness is 3 in. Stroke is 2½ in. and adjustment ½ in. by wedge. The distance from the bed to the slide, with stroke down and adjustment up, is 14 inches.

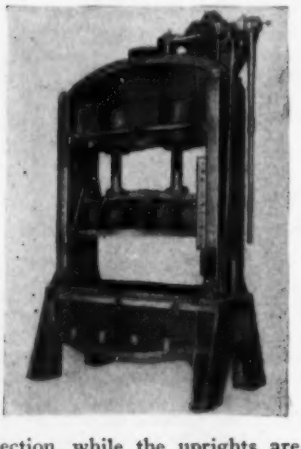
Weight, 13,000 pounds.

## — 185 —

### Press, Screw or Tryout

*Minster Machine Co., Minster, Ohio.* [Vol.71,p.1065]

This press is made in various sizes and is designed with the same frame construction and accuracy as a straight-side press. The frame is of four-piece, steel, tie-rod construction. The base and crown are heavily ribbed to insure minimum de-



flection, while the uprights are extra heavy to withstand lateral stresses.

The screws are made of high-carbon steel. A heavy slide is used. The two threaded sleeves, operating on the screws, are mounted in the crown of the press.

A 5-hp. motor, through a train of gears, actuates the threaded sleeves and moves the slide at 9 in. per minute. An automatic reversing switch controls the motor, which has sufficient capacity for exerting pressures to 50 tons on the ram. At this pressure the clutch is switched to the ratchet, which is capable of exerting a pressure of 100 tons. The slide is arranged to receive cross bar knockouts, and the base is arranged to receive either spring pressure attachments or air cushions.

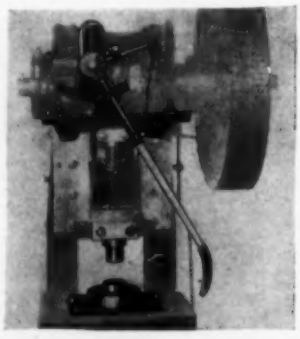
The specifications are as follows: Diameter of screws, 4 in.; travel of slide, 18 in.; distance between uprights (to clear) 60 in.; area of bolster plate, F-B x R-L, 32x60 in.; area of slide, F-B x R-L, 23x55½ in.; and opening in bed, F-B x R-L, 21x58 inches.

## — 186 —

### Safety Guards for Punch Presses, Improved

*Wiesman Manufacturing Co., 4th & St. Clair Sts., Dayton, Ohio.* [Vol.71,p.795]

While accomplishing the same purpose as before, the improved safety guard for punch presses has been completely redesigned. The part of the mechanism that sweeps the operator's hand aside when the punch descends was previously made of wire held to the swinging mechanism by four screws and locknuts. In the present design a piece of sec-



ond-growth hickory replaces the steel wire.

The mechanism consists essentially of a swinging pendulum arm actuated by a rocker arm. The guard does not interfere with the operator, who works the same as usual. It does not touch him in any way, unless his hand is still on the die when the punch descends, in which case his hand is brushed swiftly to one side. The guard is made in eight sizes.

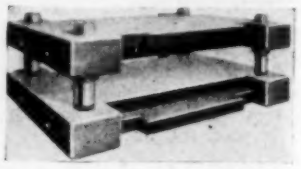
## — 187 —

### Die Sets

*Danly Machine Specialties, Inc., 2110 South 52nd Ave., Chicago, Ill.* [Vol.71,p.799]

This complete line of large die sets consist of 4-post and 2-post rectangular die sets, 4-post square die sets, 2- and 3-post long, narrow die sets, together with heavy-duty guide posts and bushings for these sets. Altogether there are five different types and 85 different sizes.

Both punch and die holder are equipped with notches so that slings or lifting chains cannot slip. All edges are bevelled. One pin of each set is a quarter of an inch off center to prevent the punch holder being turned around inadvertently. All sets are equipped with removable guide posts so that the die may be ground without removal from



the die holder. The long narrow die sets are equipped with bosses or pads for stripper bolts. These large die sets are standardized and are practically a continuation of the company's "J" and "K" sets.

# *Punching and Shearing Machines*

## — 188 —

### Punches, Heavy-Duty, Toggle

*Beatty Machine & Manufacturing Co., Hammond, Ind.* [Vol.71,p.185]

This series of heavy-duty toggle punches is for use in structural steel shops where the punchings of flanges and webs in one handling requires a large

die space from front to back. The main body extending up in the housing has been lengthened to the same size as the space for tooling. A double set of toggles, operated by a connecting rod from the main shaft, is used to operate the head and distribute pressure equally. The main shaft is fitted with an automatic stop clutch operated by a solenoid. The weight of the ram is counterbalanced by heavy springs.

The driving gears are assembled in a self-contained unit, and the driving motor is mounted at the rear. The automatic stop clutch is operated by an electric solenoid with remote push-button control for convenience in working on awkward shapes.

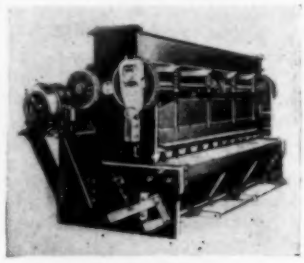
The punch is of all-steel construction, with bronze-lined slide bearings, bronze-bushed shaft bearings, and a single-shot, forced-feed lubrication. General specifications of the tool space are: Length of head from front to back, 60 in.; right to left, 12 to 40 in., as required; distance from face of head to table, stroke down, 48½ in.; stroke, 3 in. Several sizes of presses are being manufactured, ranging in capacity from 150 to 600 tons.

## — 189 —

### Shear, Gap, Overhead-Drive

*Dreis & Krump Manufacturing Co., 74th St. & Loomis Blvd., Chicago, Ill.* [Vol.71,p. 417]

Embodying all-steel welded construction, this shear has a simple adjustment in the connecting bars for raising and lowering the upper knife bar, an adjustment that is necessary in the change from the shearing of sheets requiring one stroke of the upper knife bar to the shearing of sheets requiring more than one stroke, and vice versa.



Other features are: Extra-long front gage arms, side extension squaring gage, wide-range back gage, and automatic back gage operating from one end only.

The machine is obtainable either belt- or direct-motor-driven. Standard gaps are 18 and 24 in. Special gaps can be furnished. The shears have an over-all length varying from 5 ft. 6 in. to 16 ft. 8 in. for both standard sizes of gap.

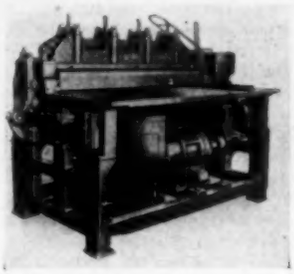
Weights, 3,000 to 45,500 pounds.

## — 190 —

### Slitting Machine, Gang, Rotary, Type K

*Putnam Machine Works, Fitchburg, Mass.* [Vol.71,p.513]

These slitting machines, improvements of the Lamb & Nash slitters and built in three sizes in the "K" type, are arranged



with the cutter frames interposed between two sets of feed rolls. The cutter frame carries the two cutter shafts and is arranged to swing out from between the rolls to give accessibility. There are two types of cutter frames, the solid, which is standard equipment, and the adjustable, which is furnished as an extra.

Intake and discharge rolls are provided with adjustments. They exert sufficient pressure to feed the stock. The discharge rolls are hardened and ground to resits scoring by the edges of cut strips. Both sets of rolls are power-driven and are geared direct to the cutter-shaft. Belt or motor drive is furnished.

## — 191 —

### Shear, Punch, and Coper, Combination, No. 7

*Joseph T. Ryerson & Son, Inc., Chicago, Ill.* [Vol.71,p.517]

The No. 7 combination shear, punch, and coper has been designed to meet the demand for a large capacity machine. It is built with the same general features as the smaller Ryerson combination machines.

The punch is capable of handling almost all of the structural shapes. A single slide handles the shearing of angles,

bar cutting, plate shearing, and coping. The angle-shear attachment handles both inside and outside miter cutting and straight shearing. The blades in this unit are made in sections. Bar-cutting blades are located directly below the angle-shear blades. The full range of rounds and squares is handled by one set of blades.

The punch attachment has a 24-in. throat and capacity for punching 1 1/16-in. holes through 1-in. plate. The plate shear will handle ¾-in. material of any length or width. Other capacities include: Flat-bar shearing, 7x1 in.; rounds, 2¼ in.; squares, 2x2 in.; angles, 6x6½ in.; angles in miter, 4x4¼ in., and notches in 4x4x½-in. angles.

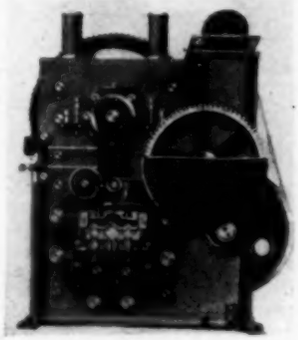
## — 192 —

### Shears, Bar and Billet, Model 76

*David H. Smith & Sons, Inc., Brooklyn, N. Y.* [Vol.71,p.563]

This bar and billet shear of unbreakable steel-plate frame construction, built by R. Sonntag, G.M.B.H., Gera-Zwoetzer, Germany, has a capacity to shear a 6½-in. square billet cold.

The shearing opening in the body is reinforced by a steel casting. The bearings for the shafts are held in castings fitted into holes bored in the frame plates. The lower knives are



mounted on this casting and are easily removable. The eccentric shaft is made of forged steel and is driven by double gearing.

The hold-down clamp can be adjusted to the bar being sheared. Bars are fed to the machine over an adjustable swiveling roller. Controls are operated by a hand lever or a foot pedal which engages a claw clutch of improved design. The clutch disengages automatically upon completion of the stroke.

Standard equipment consists of one pair of knives for either rounds, squares, or flats. The machine is supplied with either belt drive or with geared or belted motor drive. An adjustable back gage is an extra.

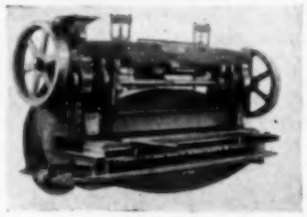
The machine is offered in nine sizes, having capacities varying from 2 7/16- to 7-in. rounds sheared cold. Shear knife lengths vary from 8½ to 18 in. and the stroke varies from 1⅞ in. to 4¼ in. A 6½ hp. motor is required for the smallest size and a 65-hp. motor for the largest. The smallest size machine operates at 420 r.p.m. and the largest at 320 r.p.m. The approximate weight of the smallest size is 4,800 lb., of the largest it is 56,000. Floor space varies from 5x4 ft. for the smallest to 12x8½ ft. for the largest shear. The smallest machine makes 22 strokes per min., and the largest, 10 strokes per minute.

## — 193 —

### Shears, Squaring, Mill, Heavy-Duty, No. 14-M

*Niagara Machine & Tool Works, Buffalo, N. Y.* [Vol.71, p.1022]

Capacity to shear from ½- to ¾-in. mild steel plate in lengths from 60 to 192 in. is built into these No. 14-M mill squaring shears. The main eccentric shaft is a hammer-forged steel piece of large diameter, turned and ground. The eccentrics are



forged solid with the shaft. Close spacing of the supporting bearings reduces vibration, resists deflection, and minimizes bending stresses. The two end bearings are solid sleeves fitted into the housings. The patented Niagara individual spring-foot holddown has been incorporated.

Provision is made for counterbalancing the crosshead by springs or weights where compressed air is not available. The lower knife chuck is adjustable from front to back.

A jaw clutch provided with three engaging surfaces controls the motion of the crosshead. Shears of the "M" series are double geared. Belted or geared motor drive can be supplied.

## — 194 —

### Punch, Turret, "Eda"

*Wiederman Machine Co., 1817 Sedgley Ave., Phila., Pa.* [Vol.71,p.302]

Holes in 12 sizes from ¼ to ½ in. in diameter may be punched in machine steel up to ⅜ in. thick on this turret punch. Punches and dies are simple in

design and inexpensive to replace. Special shaped holes can be punched. The machine weighs less than 100 pounds.

## — 195 —

### Punch and Notcher, No. 17 and No. 49

*Whitney Metal Tool Co., Rockford, Ill.* [Vol.71,p.913]

Two shop devices, the No. 17 punch and the No. 49 notcher, have been placed on the market. The No. 17 punch is a roller-

bearing bench type with capacity to punch ¾-in. holes through ½-in. iron and has a total depth of 6½ in., making possible the punching in the center of a 12½ in. circle. This punch is furnished with or without a work table, and is equipped with a depth gage so that a 1½-in. notch may be cut.

# *Threading Machines*

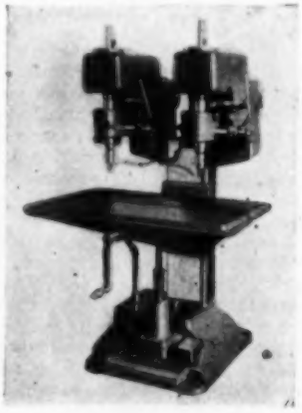
## — 196 —

### Tapping Machine, Semi-Automatic

*Rickert-Shafer Co., Erie, Pa.* [Vol.71,p.303]

This friction-driven, geared, semi-automatic, tapping machine can be furnished with single or multiple spindles in belt- or motor-driven types. It is capable of tapping 1-in. holes, 8 U.S.S. threads per inch.

A multiple-disk friction clutch is used for driving the spindles. A downward pull on the handle engages the clutch. When the



tap has reached the required depth, the trip mechanism releases the clutch in one direction, and throws it into the reverse direction immediately. This action sets in motion a train of gears which reverses the spindle. A slight upward thrust on the handle again reverses the mechanism. This machine is furnished with a pump that delivers coolant to the tap. Overflow is returned to the reservoir in the base.

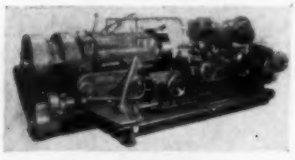
## — 197 —

### Threading and Turning Machine, Oil-Well-Tool

*Lees-Bradner Co., Cleveland, Ohio.* [Vol.71,p.494]

This thread-milling machine was designed primarily for milling threads on oil-well drilling tools, tool joints, and drill pipe, and produces these threads in a little more than a revolution of the work. In many instances, the facing and turning operations can be performed at the same chucking.

The machine is provided with



a selective-speed headstock, apron, and cross-slide with square turret toolpost. The headstock has a hollow work spindle for bar or tube work up to 10½ in. in diameter, and may be provided with air or manually operated chucks, front and rear. The headstock and cutter head units are individually motor driven. Provision is made for a large range of thread milling and cutter speeds, and power quick approach and reversal are provided. By means of a taper attachment, either straight, taper, internal, or external threads may be milled.

## — 198 —

### Threading Machine, Improved, "H & G"

*Eastern Machine Screw Corporation, New Haven, Conn.* [Vol.71,p.524]

The "H & G" threading machine has been improved by the addition of an oil reservoir and enlarged to provide more chip room. The machine is made in several types. Several bench machines may be mounted on one base to build up a multiple-spindle threading machine.

The spindle and collet slide takes a wide range of work. An open-side jaw slide is available for long rods. The machine may be equipped with ⅞-, 1⅛- or 1-in. heads and has a capacity of 11 threads per inch and under. With motor drive, the machines have somewhat greater

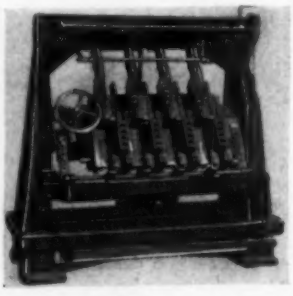
hole in the spindle for 9 in. capacities. They have a 1-in. length of threading. Bench machines occupy an area 14x35 in., and pedestal-type machines occupy a floor space of 18x35 inches. Shipping weights are 450 and 650 pounds, respectively.

## — 199 —

### Tapping Machine, Nut, Tilted, No. 14

*Holmes Engineering Co., Oshkosh, Wis.* [Vol.71,p.609]

A precision nut tapper that taps square with the face of the nut has been placed on the market. According to the manufacturer, precision is a result of four factors: First, the 30-deg. tilt of the machine permits the



nut to lie squarely on its face without danger of tipping; second, the work-holding fixtures can be lined up with the spindles, and they are adjustable; third, the fixtures are self-cleansing, and, fourth, the carriages are counterpoised to eliminate error in lead.

The capacity of the machine is to 1¼-in. U. S. S. threads, production being 20 to 30 nuts per minute. Motor drive may be substituted for belt drive if desired. Nearly any kind of nut can be handled.

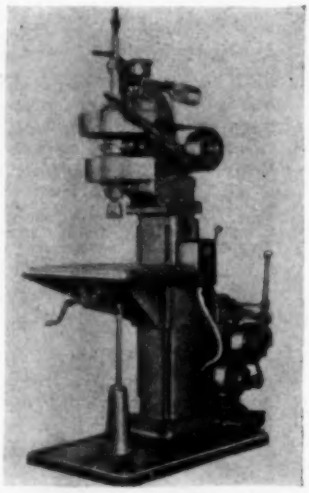
## — 200 —

### Tapping Machine, Automatic, No. 2

*Frew Machine Co., 124 W. Venango St., Philadelphia, Pa.* [Vol.71,p.716]

Rated to tap from ¼ to 1¼ in. U. S. S. threads, the No. 2 automatic tapper has features similar to those of the No. 1 machine. The head is Timken equipped and the reverse pulley is of smaller diameter than the tapping pulley, so that the tap comes out of the work at a rapid rate. The table is equipped with two T-slots, and is raised and lowered by means of a screw and bevel gears. A ball thrust bearing supports the table. A 24x20 in. table is used. The distance under the chuck is 18 in., and from the center of the table to the base of the column is 10¼ inches.

This machine can be furnish-



ed for several types of drive. The spindle speeds are dependant on the size of the pulley placed on the gearbox. Using a 1,200-r.p.m. motor and a 4½-in. pulley, the spindle speeds are 81, 106, 137, and 177 r.p.m. Provision is made to take up belt stretch.

## — 201 —

### Pipe-Threading Machine, Continuous, No. 3

*Davis & Thompson Co., 57th Ave. & Mitchell St., Milwaukee, Wis.* [Vol.71,p.569]

Designed to thread pipe up to 4 in. in diameter as a continuous operation, the No. 3 "Rotomatic" has been placed on the market. The rotating member of the machine has fingers projecting out and between the chains of the conveyor and these fingers pick up the pipe and place it in the jaws. Dies are operated by a cam and springs located on the top of the machine and the dies are forced on the pipe under the

proper pressure. After the spindle is withdrawn, the toggle opens and releases the pipe automatically.

The Rotomatic No. 3 has six spindles and each spindle carries a die. Spindles are arranged so that they will thread the pipe concentrically. Lubricant is forced through the fixture and squirted into the dies at high velocity. The automatic safety device on the machine operates in case a pipe becomes stuck in the die and the machine stops automatically. The Rotomatic is generally equipped with a variable-speed motor.

Chasers or segments can be changed readily. The diehead is adjustable for proper size. The machine is made to function at a high rate of speed and is automatic in action.

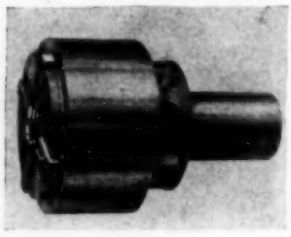
Weight, 60,000 pounds.

## — 202 —

### Diehead, Adjustable, Solid, Style KJ

*Geometric Tool Co., New Haven, Conn.* [Vol.71,p.505]

This tool uses the same chasers as the company's KD and KH dieheads, and has a size-adjustment mechanism.



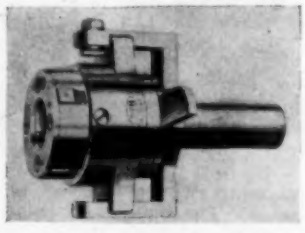
Chasers may be released quickly and easily by pressing down a thumb release on the back of the tool.

## — 203 —

### Diehead, Self-Operating, Style D

*Eastern Machine Screw Corporation, New Haven, Conn.* [Vol.71,p.507]

The Style D diehead is designed principally for use on B. & S. automatic machines and small Clevelands. The head is provided with ample float and trips by a pull-out action as the cam dwells. The length-of-



thread adjustment is self-contained on the upper driving arm. The head is closed automatically. Rotation of the turret causes the closing handle to engage with a dog on the machine.

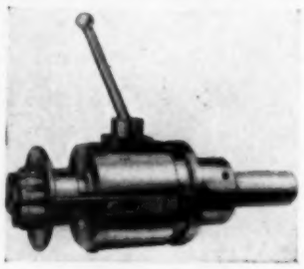
The Style D diehead is manufactured in seven sizes: ¼, ⅞, and 1 in., and No. 4 and No. 6. The diameter of the body varies from 1⅝ to 3¾ in., and the overall length 3⅛ to 7 inches.

— 204 —

### Taps, Adjustable, Classes SJ and R

*Geometric Tool Co., New Haven, Conn.* [Vol.71,p.509]

One of the features of the type SJ tap is that all working parts, even the size-adjustment mechanism, are located in the nose or front end of the tool, allowing it to cut threads to any required depth. The Class R receding chaser tap is designed for tapping taper threads where the depth is great and the taper is steep in tough material. No outside tripping mechanism is required, and all working



parts are completely inclosed.

In operation, the tap advances to the work as a jam-cut tool. The tool can be used as a stationary-type tap with plate trip, a rotary tap with plate trip, or a rotary tap with a sleeve trip.

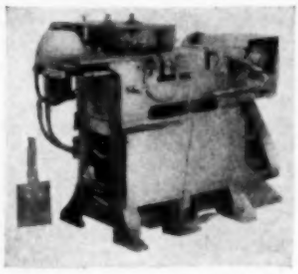
## *Welding Machines*

— 205 —

### Welder, Butt, Motor-Driven, No. 12

*Thomson Electric Welding Co., Lynn, Mass.* [Vol.71,p.71]

Equipped with special air-operated clamps and holding devices for welding back-straps to shovel blades, this special No. 12 motor-driven butt welder has a water-cooled transformer rated at 60 kva. The moving platen is mounted on side rods, which slide in bearings at the



ends of the frame. Each half of the clamp carries two bronze-bushed bearings. The jaws are self-adjusting and rocking.

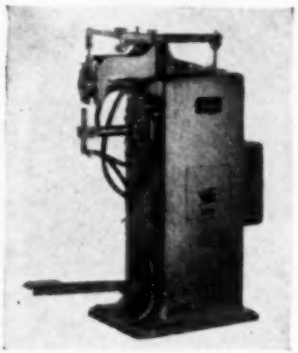
Platen push-up is obtained from a gear reduction unit driven by a 1-hp. motor. An adjustable time-cam switch is supplied and the return of the moving platen to open or loading position is obtained automatically. After the work has been clamped and the operator has depressed the foot lever, the cycle is automatic. The machine is suitable for a wide range of flat strips or other bar stock by application of suitable clamping dies and jaws.

— 206 —

### Welder, Spot, Series 180

*Thomson Electric Welding Co., Lynn, Mass.* [Vol.71,p.73]

This special unit is equipped with a vertical movement of the upper electrode, particularly desirable on high-speed welding of



light parts which are to be fed automatically to the machine. The welder is also equipped with a multiple-pointed electrode. Each upper electrode is indexed automatically to the proper position for welding during the upstroke of the upper slide. The power-drive attachment is not shown.

— 207 —

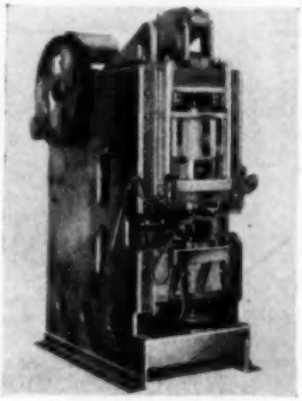
### Welder, Structural-Shapes, Vertical, Power-Driven, Heavy-Duty, Model 290

*Thomson Electric Welding Co., Lynn, Mass.* [Vol. 71,p.299]

Designed for the welding of a wide variety of work such as light fabricated joists and similar structural shapes, as well as for multiple-projection welding on stampings and forgings, the Model 290, power-driven, vertical welder is also adaptable to butt-welding various parts which can be handled best in a vertical position. Practically all of the frame parts of this welder are made of heavy plate and bar stock fabricated by electric arc welding. The operation of the machine follows conventional methods of operating automatic spot welders.

Cam-shaft drive is obtained by a 4½-hp., four-speed motor having push-button control. A reduction gear is placed between the motor and the camshaft and the cam itself has a variable removable insert, which furnishes the final pressure on the weld. A dual-pressure arrangement has been built into the machine, which it is claimed, permits lower welding current than is possible with one spring.

The lower knee of the welder is adjustable vertically for die



wear and work of different thicknesses. Standard camshaft speeds are 10, 15, 20, and 30 r.p.m.

Weight, 10,000 pounds.

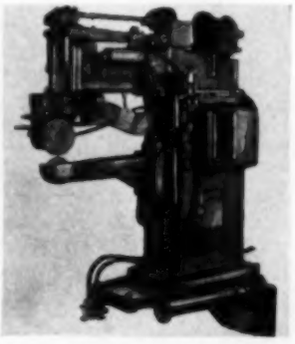
— 208 —

### Welder, Seam, Double-Roller, Model 375

*Thomson Electric Welding Co., Lynn, Mass.* [Vol.71,p.339]

Both longitudinal and circumferential seam welds may be made up to 30-in. lengths on the Model 375. The upper and lower roller shaft-bearing housing and mounting may be rotated through 90 deg. without displacing or breaking an electrical joint. Both flat and cylindrical work in gages up to No. 14 may be handled.

The machine may be supplied with a transformer rated at 100, 150, or 175 kva. One of the



features is the mounting of the upper roll. The roller is of the forged ring type and is mounted on a large hub on the rotating shaft. This shaft and the bearing housing are water cooled.

Drive of the upper roller electrode is through motor, gear-reduction unit, and change-speed gears.

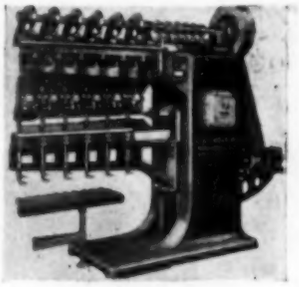
— 209 —

### Welding Equipment, Barrel

*Gibb Welding Machines Co., Bay City, Mich.* [Vol.71,p.793]

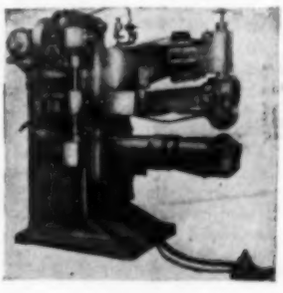
Lap welding of 16- and 18-gage sheet into cylinders for steel barrels by means of the "Gibseaming" process has been announced. The process consists of spotwelding the formed sheet on the multiple-head spot welder and then lap welding the entire seam on the "Gigseamer." A production of 100 barrels per hour is common, but 120 units may be obtained. The equipment will seam cylinders 37 in. long without reversing, and 74 in. when they are reversed. The range of diameters handled is from 14 to 36 inches.

Six cam-operated spot-welding electrodes are driven by a



flywheel on the spot welder. These electrodes are water-cooled. A roller conveyor serves to support the cylinder while in the machine. The over-all dimensions are 9 ft. 3 in. long by 7 ft. high by 30 in. wide. The weight is 3,600 lb. A 1-hp. motor furnishes the drive.

The feature of the Gibseamer is the use of knurls to drive the welding rolls. The hardened knurling roll has a knurled surface at the bottom of a peripheral groove. The knurled surface knurls the face of the welding roll to give it the proper tractive properties. The hardened edges of the groove shear off whatever weld metal adheres to the welding roll and maintain its width, so that the welding is even and the current demand is constant. In operation, it has been found that one pair of rolls will handle 25,000 barrels without attention. For the machine illustrated, the over-all dimensions are approximately 6 ft, 2½ in. long by 6 ft.



10½ in. high by 34 in. wide. The weight is 6,500 pounds.

Gibseamers are available in three standard types, the Nos. 3, 4, and 5, but the great majority of installations are special. All machines are arranged so that either a straight or circular seaming arm may be inserted in the lower horn. This permits the machine to make either straight or circular seams. The upper seaming roll will swivel into position. Machines are so arranged that there are periodic interruptions of the current without interruption of the travel of the seam rolls.

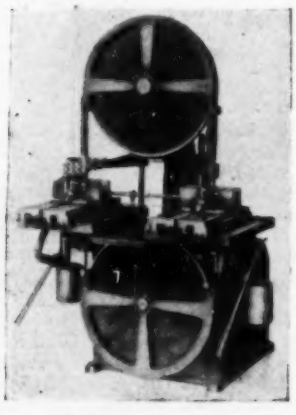
# *Other Machines*

## — 210 —

### Bandsaw, Metal-Cutting, Type C.M.T.

*William Laidlaw, Inc., Belmont, N. Y.* [Vol.71,p.753]

The type C.M.T., metal-cutting bandsaw, when cutting bar stock, has a capacity of 12 x 12 inches. Although intended primarily as a production machine for cutting either long or short pieces on either side at the same time, it is also readily adaptable to special jobs. While the saw is in the center of the vises and carriages, and not on one side as is the usual practice, either side can be set for cutting at any angle almost instantly. The saw



is prevented from cutting into the vise.

Another feature is the swivel tables, which permit the cutting of all pieces up to 30 in. long. For cutting of pieces longer than 30 in., a twist of only about 15 degrees is necessary. Quick-action vises are mounted on heavy carriages supported on steel balls traveling in accurately machined ways. The saws can be changed without removing the guards.

The power unit is mounted on a separate plate, and is housed in the base. The entire unit is ball-bearing equipped, and all gears and bearings run in oil. The base plate, with all parts mounted thereon, can be removed from the frame casting as a unit. Four speeds are obtained through the sliding-gear transmission, controlled by a shift lever extending up through the frame casting in a position convenient to the operator and directly under the starting switch.

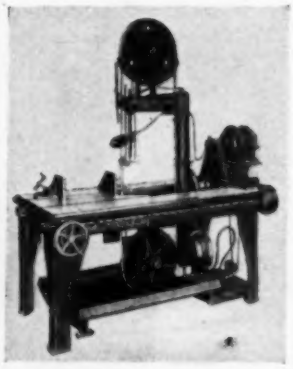
## — 211 —

### Bandsaw, Metal, No. 8

*Armstrong-Blum Manufacturing Co., 357 N. Francisco St., Chicago, Ill.* [Vol.71,p.187]

The feed drive consists of a friction-disk clutch taking power from the main-drive motor. When the counterweight is set, it will hold the clutch in driving position until the correct pressure is built up, and will disengage the clutch before excess pressure can do harm. Hand control of the feed or carriage travel is provided. Standard ball bearings inclosed in Alemite-equipped housings, ground shafts, an inclosed feed worm and worm gear running in oil, a quick-action ball handle, a centrifugal cutting-lubricant pump, and electrical equipment are features.

The machines can be furnished belt-driven, or motor-driven. They will handle work from the smallest material up



to large bars or shapes 18 in. in diam., or 18x20 in. square, and make both straight and angle cuts. Conveniently located degree graduations give instant settings for any desired angle.

## — 212 —

### Broaching Press, Hydro-Pneumatic

*Hannifin Manufacturing Co., Chicago, Ill.* [Vol.71,p.521]

Ordinarily it is impossible to use air-operated presses for broaching operations because of the great speed at which the ram travels, causing the broach to plunge into the hold and break. This objection has been overcome in this design by ap-

plication of hydraulic speed control. Control consists of two small cylinders mounted on either side of the air-operated power cylinder. Speed control is accomplished by regulated transfer of oil from the top to the bottom of the oil control cylinders. The press is not designed for broaching operations that require broaches exceeding 12 in. in length. T-slots in the bed permit attachment of fixtures.

## — 213 —

### Broaching Machine, Surface, No. 1

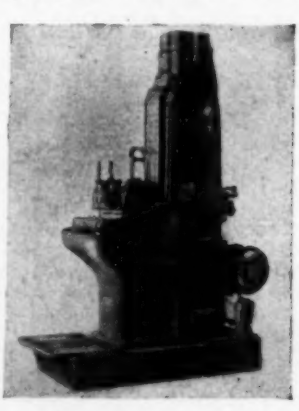
*Foote-Burt Co., Cleveland, Ohio.* [Vol.71,p.532]

The "Footburt" No. 1, surface broaching machine is used for roughing and finishing one or more flat or irregular surfaces in one operation. All work within certain size limitations is handled on a machine of standard dimensions, but the fixtures and broaches are designed specially for each job.

The reciprocating movement of the broach is accomplished by a hydraulic pump driven by a motor through a silent-chain belt running in oil. Slow cutting speeds, averaging from 10 to 40 ft. per minute, are used.

The broach is of heavy-back construction and is secured in a holder on the slide, making practically one solid piece and minimizing vibration. When it is necessary to sharpen the broach it is removed by withdrawing a few socket-head cap-screws.

The broach holder is fastened securely to the broach slide,



which is in turn bolted directly to the lower end of the hydraulic plunger, or piston rod. The slide moves up and down on long, narrow dovetail ways. A 7½ hp., 1,800-r.p.m. constant-speed motor is usually recommended. Lubrication of the machine is easy and positive. The pump, valve, and cylinder are filled with oil at all times.

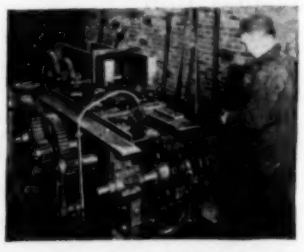
## — 214 —

### Broaching Machine, Semi-Automatic

*Amalgamated Metal & Machine Co., Cleveland, Ohio.* [Vol.71,p.754]

Economical broaching on a semi-automatic basis is possible on this machine. The manufacturer states that 0.001 in. is a conservative tolerance, and that production on almost any shape, small or large pieces, is feasible.

The feature of the machine is



the use of two matched, endless Link belts carried on sprockets, and carrying attachments holding the broaches. The attachments travel in hardened steel ways. Under each, there is a half nut that engages a screw or worm just beyond the moveable faceplate. Two of these nuts are always engaged so that continuous movement is imparted to the conveying chains. The worm driving the half nuts is driven itself by spiral gears.

There are two ways to feed this machine. The machine is adapted to both external and internal broaching, and will use broaches up to 13 in. in length.

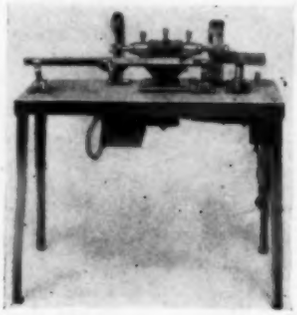
## — 215 —

### Core-Cutting and Coning Machine, No. 1

*Wadsworth Core Machine & Equipment Co., Akron, Ohio.* [Vol.71,p.606]

A portable, motor-driven cutting-off and coning machine for the core maker has a capacity of ¾ to 2¾-in. cores and can be moved to any convenient place. It is powered with a ¼-hp., 110-volt, a.c. motor, which may be driven from the ordinary light circuit. All working parts are fully guarded and ample lubrication is accomplished. The motor is controlled by a convenient push-button switch.

This machine is equipped with guarded cutting-off and coning wheels, a swing rest for holding



the core while it is being cut off, and an adjustable core rest for the coning wheel. The swinging rest has a graduated scale and a movable stop that can be adjusted to give any length of core desired. The coning-wheel core rest allows the operator to make any desired taper or cone on the end of the core.

## — 216 —

### Core-Making Machine, No. 1

*Wadsworth Core Machine & Equipment Co., Akron, Ohio.* [Vol.71,p.566]

A motor-driven core-making machine using the same dies, conveyor screws, and other accessories as the No. 1 hand-type core-making machine has a capacity of from ⅜ to 3 in. diam.

cores and is direct-connected for motor drive, powered with ½-hp. motor operating on 110 and 220 volts a.c. The machine has a simple and efficient safety clutch incorporated in the drive. Lubrication is taken care of at four places located at convenient points on the machine.

## — 217 —

### Flue Roller, 1½ to 6-Inch

*Joseph T. Ryerson & Son, Inc., Chicago, Ill.* [Vol.71,p.521]

This flue roller rolls down the weld of the tube and safe-end after they have been welded, by using the welding heat. The cast frame of the machine supports a hollow cylinder rotated by silent-chain drive from a 5-hp., 1,200 r.p.m. constant-speed motor. On the front of the rotating cylinder are three idler-rollers, adjustable in or out from the center. A stationary mandrel supports the tube in the center of the rotating cylinder and carries at the cen-

ter of the welding rollers a welding former for each size of tube to be welded. This machine will weld tubes from 1½ to 6 in. in diameter. The mandrel is supported by a bracket in the back end of the machine, and also by a sliding support bushing adjustable to accommodate various lengths of safe-ends.

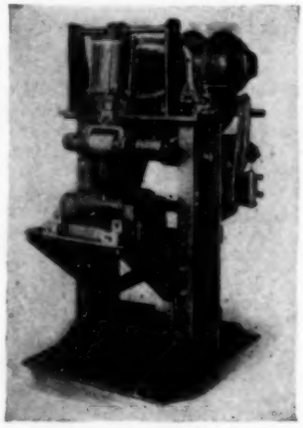
## — 218 —

### Flue-Cutting and Polishing Machine

*Joseph T. Ryerson & Son, Inc., Chicago, Ill.* [Vol.71,p.480]

A flue-cutting and polishing machine has been developed for locomotive flue-shops where boiler tubes and flues are welded by the electric butt-weld method. This machine combines the two operations of cutting off the fag end of the tube or flue, and polishing the end that is to be placed in the welder.

The machine has a welded steel frame, on which is mounted a bracket with two spiral rollers to hold the tube. A separately operated cut-off attachment is



mounted on the machine and is operated by an air-cylinder arranged with an oil dashpot to provide slow movement of the arm.

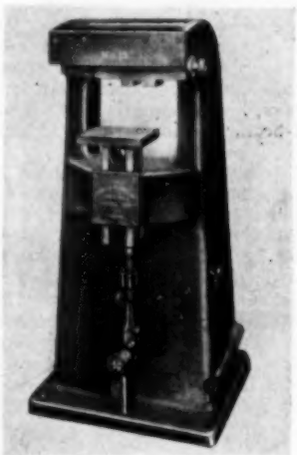
Both cylinders are operated from one air-valve. The machine is driven by a 5-hp., 1,200-r.p.m. motor and will handle tubes from 1½ to 6 in. in diameter.

## — 219 —

### Marking Machines, Power-Driven, No. 15

*Noble & Westbrook Manufacturing Co., 20 Westbrook St., East Hartford, Conn.* [Vol.71, p.528]

The No. 15 power-operated marking machine can mark flat work up to 6 in. long and round work 3 in. long with a special flat die. It uses steel dies and marks uneven surfaces as well as parts that vary in thickness. The power is applied through a wormgear drive by means of a clutch. A single mark may be made or the machine may be arranged to mark continuously. The marking-die holder has a



dovetail shank which permits taking the complete die assembly out of the machine without disturbing the other adjustments. A speed range of 30 to 40 strokes per minute is obtainable. A 1-hp. motor is ample for ordinary requirements. Gears and cams run in oil. Either motor or belt drive can be used on the machines.

Floor space, 23x27 in.; height, 51 in.; weight, 950 pounds.

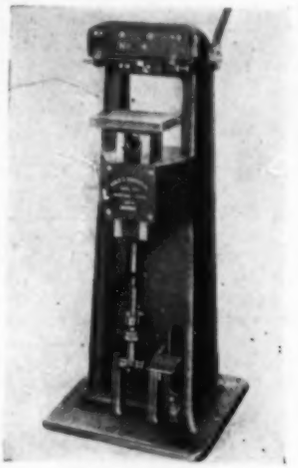
## — 220 —

### Marking Machines, Hand-Operated, No. 4

*Noble & Westbrook Manufacturing Co., 20 Westbrook St., East Hartford, Conn.* [Vol.71, p.528]

The No. 4 hand-operated marking machine will mark flat or round metal parts of various shapes and sizes, the parts being held in a fixture. Markings can be made 6 in. long. The pressure is applied by means of a treadle and the die is moved across the part by pulling the handle down. The maximum distance between the slide and the table is 8½ in., and, under a round die, 6½ inches.

The No. 4 machine can be fitted up with a flat die for marking on round surfaces.



Both round and flat marking dies can be furnished.

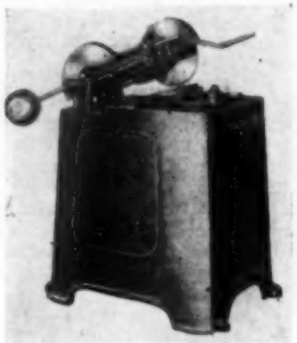
Floor space, 18x20 in.; height, 48 in.; weight, 375 pounds.

## — 221 —

### Saw, Metal, Cutoff, No. 4

*Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.* [Vol.71,p.188]

This saw, developed to cut brass, bronze, and copper shapes, is mounted on a balanced tilting frame, and is fed by an offset hand lever. The blade is driven by a roller chain and sprockets. The saw guard tilts



to facilitate saw removal. Motor and starter are inclosed. Work is clamped by a quick-acting eccentric vise. Angle cuts as well as straight can be made.

Specifications: Capacity, rounds, 3 in., over-all section, 5x1¾ in.; diameter of blade, 10 in.; peripheral speed, 1,300 ft. per min.; floor space, 24x48 in.; height to table, 31 in.; net weight, with standard motor and starter, 950 lb.; standard motor, 3 horsepower.

## — 222 —

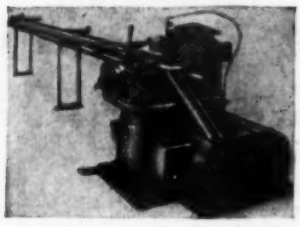
### Saw, High-Speed, Automatic, No. 21

*Cochrane-Bly Co., Rochester, N. Y.* [Vol.71,p.481]

The No. 21 automatic high-speed saw has been introduced for cutting non-ferrous metallic tubing, rod, strip, and extruded

sections, and also fiber, Bakelite, hard rubber, wood, magnet steel, and drill rod. A positive clutch connects the drive shaft with the camshaft operating the carriage, and depression of a treadle engages the clutch. If the treadle is released, the carriage will stop at the end of the back stroke. The carriage slides on dovetail ways.

The speed box provides a range of feeds of from 5 to 50 strokes per minute. The vise is adjusted and opens and closes automatically in timing with movement of the saw carriage. The movement of the vise jaw can be adjusted from nothing up



to ½ in. The machine is usually equipped with pump and connections to deliver a suitable cutting lubricant on the blade or wheel. Special vise jaws and fixtures can be furnished for holding two or more bars at one time and for special and odd-shaped extruded bars.

Motor drive, as regularly furnished, is by a 5-hp. 1,200-r.p.m. motor. The automatic bar feed is driven by a separate motor. One operator can run two machines on a large variety of work.

The standard saw blade is ⅝ in. thick, but other thicknesses may be used. An abrasive wheel may also be used for cutting hard materials.

Specifications: Diameter of saw blade, 16 in.; maximum capacity, rounds, 4 in.; movement of carriage, ½ to 4½ in.; adjustment of carriage, 3¾ in.; number of strokes per min., 5 to 50; number of feed changes, 6; floor space, belt or motor drive, 50x60 in.; floor space with 15-ft. automatic feed, 60x240 in., and net weight, belt drive, about 3,000 pounds.

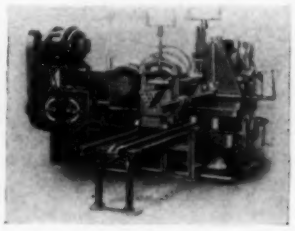
## — 223 —

### Sawing Machine, Metal, No. 55, "Cobly"

*Cochrane-Bly Co., Rochester, N. Y.* [Vol.71,p.678]

This metal-sawing machine has the bed and carriage ways cast integral and mounted in a deep pan. Drive is through a friction clutch operated from either the front or the side position, and a sliding-gear transmission giving four cutting speeds of 42, 60, 75 and 90 ft. per min. The feed screw is mounted above the ways in line with the center of the saw arbor and close up to the blade.

The sixteen changes of feed



are entirely independent of speeds and any feed is applicable to any speed. The feed clutch can be operated from either the front or side working positions. Adjustable stops regulate the length of carriage travel and trip the feed into reverse, giving automatic quick return of carriage. The feed can be stopped at any point without going into reverse and without stopping the machine.

The vise V-block has a 90-deg. included angle, and is suitable for round, square or rectangular bars. Capacity: Round bars, 7½ in.; square bars, 6½ in.; I-beams, 10 in., and rectangular sections, 5x10 inches.

Specifications: Diameter of saw blade, 24 in.; feeds, per min., ½ to 10 in.; size of work table, 21x22 in.; motor required, 7½ hp.; floor space, 36x96 in., and weight, net, 4,500 pounds.

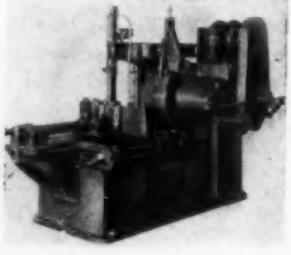
An air clamp can be furnished in place of standard screw vise. Power stock feeding and unloading apparatus can be furnished. Motor drive is by silent chain or Texrope.

## — 224 —

### Sawing Machine, Metal, Heavy-Duty, Vertical

*Peerless Machine Co., 1615 Racine St., Racine, Wis.* [Vol. 71,p.720]

Intended for cutting large bars and billets, a 14 by 16-in. vertical, heavy-duty, metal-sawing machine has been placed on the market. The blade operates up and down while it is being forced into the work. The vertical position of the blade enables a powerful stream of cooling solution to be applied at the top



of the cut, which is of assistance in forcing out the chips at the bottom. The blade relieves itself automatically on the non-cutting stroke, and at the conclusion of the cut, the machine is tripped out automatically after which the saw frame carrying the blade returns to the starting position and stops. The feeding arrangement includes both a positive and a compensating feed, with the positive feed provided with a safety feature.

The machine is arranged with ball bearings throughout and the transmission runs entirely in oil. Three speeds are available. Chain drive is used. The machine can be set to trip out at any given distance within its capacity, and is arranged to use saw blades from 17 to 24 in. in length.

The space required is: Length 10 ft., height 4 ft. 9 in., width 4 ft. 4 in. The weight, as stated previously, is 4,500 pounds.

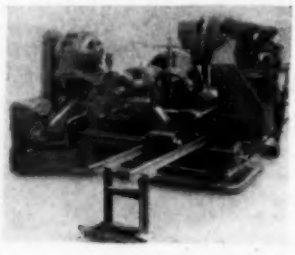
## — 225 —

### Sawing Machine, Metal, Improved, No. 66

*Cochrane-Bly Co., Rochester, N. Y.* [Vol.71,p.797]

Capacity to cut up to 10-in. round bars is found in the No. 66 metal sawing machine. The machine has Oilgear feed, duplex-compound, toggle air clamps, and flood lubrication of the blade.

Specifications: Capacity, round bars, 10 in., square bars, 9 in., I-beams, 12 in., rectangular sections, 8x12 in.; capacity 60-deg. fixtures for multiple cutting, ½-in. bars, 151; 2-in. bars, 13, and 4-in. bars, 4; saw blade,



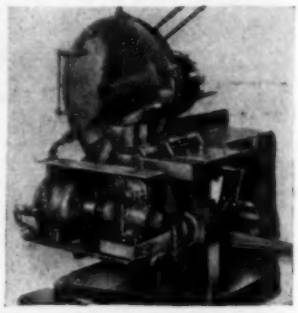
diameter and thickness 28 in. by ¼ in.; saw speeds, feet per min., 45-60-75; diameter of saw arbor, 5 in., diameter of saw collars, 7 in., speed of drive shaft, 450 r.p.m., feed range, ½ to 13 in. per min.; motor required, 15 hp., 1,200 r.p.m.; floor space, belt drive, 60x104 in., and net weight, 10,000 lb. Motor drive may be furnished.

## — 226 —

### Sawing Machine Attachment, Work-Rotating, No. 0

*Joseph T. Ryerson & Co., Inc., Chicago, Ill.* [Vol.71,p. 489]

This rotating attachment for the No. 0 friction saw minimizes the burr in cutting round tubing, pipe, and bar stock. It consists of a special work table on which are mounted supporting rollers for holding the stock in position while being cut. One set of rollers is driven by direct gearing from a fractional-horse-



power motor, through a speed reduction unit and gearing. A second set of rolls is mounted on an adjustable bracket which may be moved in or out to accommodate various sizes of stock. A third roller is brought down on top of the stock by means of an air cylinder.

## — 227 —

### Rivet Presses, Wedge Type, Air-Operated

*Hannifin Manufacturing Co., Chicago, Ill.* [Vol.71,p.487]

Although primarily designed for riveting operations, the wedge-type, air-operated riveting presses are adaptable to other squeezing operations that require comparatively high power throughout a short ram movement. The only moving part that is exposed is the ram, and only five points require lubrication. The frame casting is of open-hearth steel. The

cylinder is double acting.

These machines are available in thirteen sizes in the vertical type, ranging from 5 to 80 tons ram pressure, and in eight horizontal models within the same power range. There are also two portable models available, one of 5 tons and the other of 10 tons.

## — 228 —

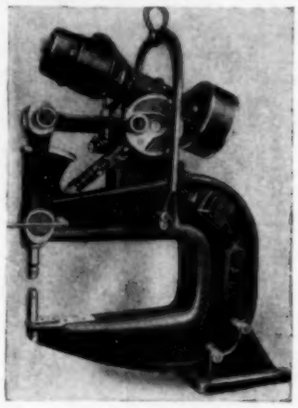
### Riveting Machines, Electro-Mechanical

*United Machine Tool Corporation, 75 West St., New York, N. Y.* [Vol.71,p.607]

Seven sizes of these electro-mechanical, toggle-lever riveting machines, having working pressures ranging from 27 to

145 tons, and capacities to drive from ⅝- to 1⅛-in. boiler rivets, have been placed on the market. The 35-ton, or second, size will give 24 strokes per min. Motors ranging from 2 to 7½ hp. are used.

The motor drives two disks through a bronze wormwheel



meshing with a steel worm. The machine may be adjusted to work consecutively, stroke after stroke, or so that the spindle stops at the top and bottom of each stroke, permitting the rivets to cool under pressure.

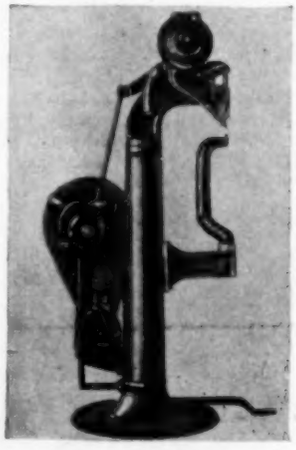
The height of gap is usually 15¾ or 19¾ in., but any other height of gap may be had. The depth of the gap is variable from 1 ft. to 13 ft. 2 in. The machine will work in any position. Special types of hangers can be had at additional cost. The smallest, low-pressure machine has dimensions of 31½x 54½x71 in., the weight being 2,030 lb. The largest high-pressure machine occupies a space 27⅛x98½x232 in., and weighs 43,870 pounds.

## — 229 —

### Rivet-Setting Machines, Automatic

*Tubular Rivet & Stud Co., 87 Lincoln St., Boston, Mass.* [Vol.71,p.911]

Feeding, inserting, and setting small split rivets automatically can be done on a rivet-setting machine. These ma-



chines have been found suitable for assembly operations on radio sets and similar work. Power is supplied by a self-contained motor which can be plugged into any available lamp socket. The machine runs at a speed of 200 rivets per minute, which is above the number of operations that is possible. It is stated by the manufacturer that radio manufacturers have speeded up the assembly of their sets from five to eight times by the use of the machine.

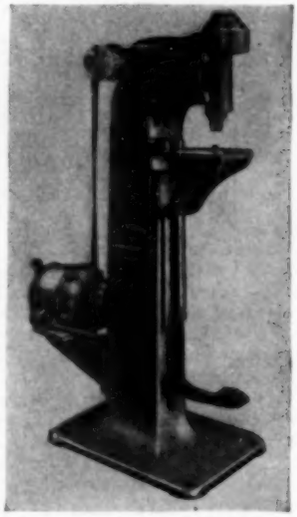
## — 230 —

### Rivet-Spinning Machine, Rotary, No. 30-D

*Linley Brothers Co., Bridgeport, Conn.* [Vol.71,p.1024]

The No. 30-D rotary rivet spinning machine is of the floor type with horizontal motor drive and is built to rivet iron or cold rolled steel rivets up to ⅛ in. in diameter. It is similar in design to the No. 10 machine, but is much heavier.

The specifications are as fol-



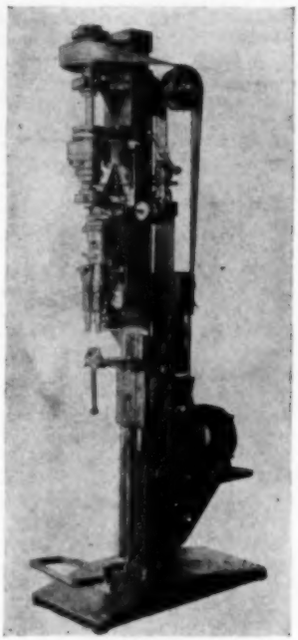
lows: Height overall, 57½ in.; distance from column to center of spindle, 6 in.; table drops from spinning rolls, 19 in.; spindle travel, 0 to ⅛ in.; spindle speed, 1,500 r.p.m.; dimensions of table, 8x9 in.; motor speed, 1,725 r.p.m.; motor hp., 1; floor space, 17x38 in.; weight, with motor bracket, 330 pounds.

## — 231 —

### Nut-Driving Machine, Two-Spindle

*Baush Machine Tool Co., Springfield, Mass.* [Vol.71,p.223]

The Reynolds nut-driving machine, formerly manufactured by the Metalwood Manufacturing Co., now contains several improvements. In the rear of the column is a vertically adjustable bracket carrying a 2-hp. constant-speed motor. Countershaft drive is optional. Where d.c. is not available, a d.c. generator may be fitted.



The lower end of the drive shaft supports a magnetic clutch. One spindle is driven directly from a differential and the other through a quill gear and idler gear.

The lower end of the spindle carries a detachable socket wrench in which the nut or cap-screw is placed and held magnetically. The machine has been improved by substituting a centrifugal mechanism for making and breaking the magnetic clutch circuit through a mercury switch. Spindles run at approximately 50 rev. per minute.

## — 232 —

### Screw Driver and Nut Setter, Power

*N. A. Strand & Co., 5001 N. Lincoln Ave., Chicago, Ill.* [Vol. 71,p.1021]

This power screw-driving and nut-setting attachment is for use with standard Strand flexible-shaft equipment or with the suspended motor unit shown. Four sizes of heads are supplied for driving nuts of ¼, ⅜, ½, and ¾ in. and Nos. 10, 14, 18, and 24 screws, respectively.

One of the features of the driving attachment is the tapered friction drive, which can be adjusted to any desired amount of resistance. Speed reduction at the tool is obtained by means of a worm and wheel with ratios of 10 to 1 and 12 to 1. The driving spindle is provided with a release clutch, and may be operated right or left hand.

With the screw-driving attachment, the bit is shrouded in a steel sleeve. For driving nuts, an adapter is provided with a hollow hexagon head.

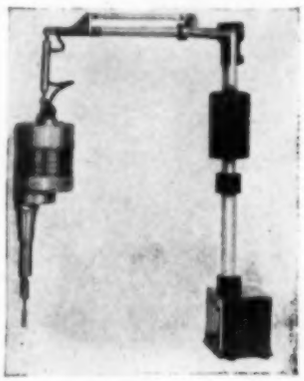
## — 233 —

### Screw-Driving Machine, Electric Type, CSB-B

*Ray Machine Co., 5403 West Lake St., Chicago, Ill.* [Vol. 71,p.1024]

Several different styles of mountings are available for the standard Type CSB-B electric screw-driving unit. One type consists of a screw-driving unit mounted on a counterbalanced swinging bracket. Again, the unit may be mounted as an overhead trolley type. A bench-type mounting is also available, and this unit is operated by foot power.

In the mounting shown, the parts consist of castings and seamless steel tubing. The horizontal arm and the vertical standard are adjustable, and the vertical arm on which the screw-driver unit is suspended is universal in its movements. The arm is so made that the unit can be removed quickly without the use of tools. A transformer may be housed in the base when the available cur-



rent is other than 110 volts. The motor used is of the split-phase induction type and operates at a moderate speed. The rotor runs on ball bearings. An entirely automatic switch and a ventilating fan are attached to the rotor.

The screw-driving bit rotates only at the time the screw is being driven. The unit is supplied for 110-volt, 60-cycle, single-phase circuits, but can be furnished to order for other currents.

— 234 —

## Babbitting Machines, Centrifugal

*Manufacturers' Consulting Engineers, 487 S. Salina St., Syracuse, N. Y.* [Vol.71,p.337]

Centrifugal babbitting machines in three sizes, 8- 12-, and 18-in., have been developed for connecting rods of those sizes. The motor is built in. Ball bearings are used on the spindle pulley, and belt tension is maintained by a spring-type, roller-

bearing idler pulley. A cone-type clutch drives the spindle, which is stopped by disengaging the clutch from the spindle pulley and engaging the other side of the clutch with a stationary brake drum.

The clutch is thrown from the driving to the breaking position by the vertical lever and the fixture clamp plate is opened or closed by the horizontal lever.

The approximate net weights of the 8-, 12-, and 18-in. sizes are 910, 970, and 1,140 lb., respectively. The floor space occupied by the models is 30x30 in., 30x36 in., and 30x48 inches.

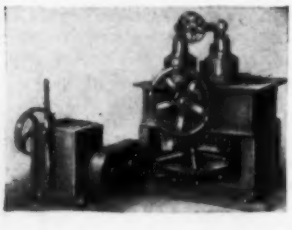
— 235 —

## Bending Machine, Cold

*David H. Smith & Sons, Inc., 51st St., Brooklyn, N. Y.* [Vol. 71,p.567]

A cold-bending machine for rolling angles, tees, beams, channels, flats, rounds, and squares in circles or arcs, is imported from Germany, being constructed by Herkules-Werk, Wetzlar.

The machine has a cast table on which are three rolls mounted on vertical shafts. Two of



these rolls are in a fixed position. The third roll is mounted on a slide, and is moved inward horizontally by means of a handwheel. All pieces are bent cold. The larger sizes have two speeds obtained by the interchanging of two gears.

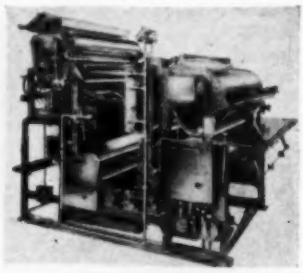
The machine is made in six capacities, the smallest size handling angles with the leg out 2x2x¼ in., rolling to a smallest diameter of 24 in. The largest size will handle angles, leg out, of 8x8x1 in., rolling to a small diameter of 118 in. In the smallest size, the rolls travel 15 ft. per minute. Five larger sizes have two speeds varying from the first of 9 and 20 ft. per minute to 6 and 18½ in the large machine. Three and a half horsepower are required for the smallest machine, 27 for the largest. The smallest machine requires a floor space of 2x4 ft. and weighs 1,500 lb. The largest requires a floor space of 11x11¾ ft. and weighs 36,300 pounds.

— 236 —

## Blue-Printing Machine, Model 30, "Peerless"

*C. F. Pease Co., 813 N. Franklin St., Chicago, Ill.* [Vol. 71,p.263]

Speed of production, quality prints, and low operating cost are claimed for the "Peerless" Model 30 blue-printing equipment. The Model 30 will produce blue-prints, negative prints, and blue-line and brown-line prints at a speed of 12 ft. per min. After exposure, tracings are returned automatically to the tray at the front of the machine, while prints on the continuous roll of paper are carried through the machine and the subsequent operations of



washing, potashing, and drying. The paper is then rolled automatically in loose cylinder form at the rear.

The model 30 is direct gear-driven throughout, has a speed range of from 4 in. to 12 ft. per min., and is powered with a variable-speed, ¼-hp. motor, direct-connected to a fully-inclosed, gear-reduction unit running in oil. Mounted in the feed table is a four-point, auto-type, gear shift, providing two forward speeds, neutral, and reverse. Mounted above the feed table is another speed control.

The dryer of the Model 30 consists of two chromium-plated copper drums and an auxiliary air-drying unit. Single prints can be handled also. The printer can be operated separately from the washing and drying machine. The Model 30 is made in two sizes, 42- and 54-in. widths, for either 110- or 220-volt d.c. or 220-volt a.c. circuits.

— 237 —

## Bolt-Forming and Threading Machine, Automatic

*Landis Machine Co., Waynesboro, Pa.* [Vol.71,p.524]

Certain features, notably an escapement attachment and a rear delivery conveyor, have been added to the Landis automatic forming and threading machine designed to point and thread bolts of ⅛ to ¾ in. in diameter and 1 to 6 in. in length. The bolt escapement is built at

the end of the magazine. It is designed to release one bolt at a time, thus relieving the bolt to be transferred to the chuck turret of the weight of other bolts in the magazine, and preventing interference of bolt heads.

The conveyor is perforated and has an oscillating motion to move the bolts slowly toward the handling boxes. During travel, most of the coolant drains off of the bolts, is collected in a trough under the conveyor, and returns to the sump in the base of the machine. Small chips, separate from the bolts, drop through the holes in the conveyor.

— 238 —

## Testing Machine, "Synchrometer"

*Brake Synchrometer Co., 87 Lincoln St., Boston, Mass.* [Vol. 71,p.760]

Duplicating conditions under which an automobile is brought to a stop on the road, a brake-testing machine, known as the 'Synchrometer," has been developed. Four flywheels store up energy when driven by the wheels of the car, and when the brakes of the vehicle are applied, these flywheels are brought to a stop by the friction of the locked wheels, and the distance that each wheel would have traveled on the road is recorded on an indicator

coupled with the corresponding flywheel. By allowing each flywheel to record separately the action of the corresponding brake of a four-brake system, it possible to determine accurately the action of each brake and the effect of such action on the operation of the car. Whatever adjustments are required can then be made.

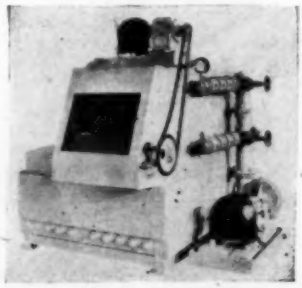
The Synchrometer consists of two axles, on each of which are mounted two flywheels and two rotors. The axles are connected by a propeller shaft and worm gears. Each of the axles incorporates two positive-jaw clutches, permitting all four wheels to be directly connected to, or operate independently of, each other. The distance between axles is adjustable to accommodate all wheelbase lengths. The wheels of the vehicle under test rest on the four rotors.

— 239 —

## Cleaning Machine, Metal Parts, Conveyor-Type, Two-Tank

*Colt's Patent Fire Arms Manufacturing Co., Autosan Machine Division, Hartford, Conn.* [Vol.71,p.523]

Embodying many of the features of the regular Colt line, this improved metal parts cleaner has unusually large capacity, a cleaning solution recir-



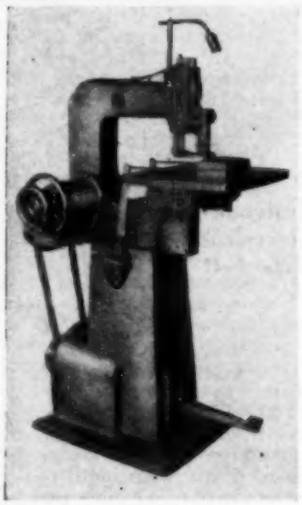
culation system, constant control of water and pressure both above and below parts being washed, and accessibility of tanks, solution, and moving parts. The conveyor is constructed of a woven material.

— 240 —

## Die-Making Machine, Heavy-Duty

*Oliver Instrument Co., Adrian, Mich.* [Vol.71,p.484]

This is a precision machine tool designed for the rapid and accurate production of dies, tools and similar work. It is



adapted to both filing and sawing on work up to 3 in. thick.

The table is 16 in. square and tilts in four directions. There is a clear distance of 16 in. back of the file. The stroke is adjustable from ½ to 3 in. and six speeds are available.

The mechanism for holding and reciprocating the files consists of two rams, one above and one below the table. Each ram has provision for adjustable clamps to hold files and saws accurately in line.

A feeding mechanism has been developed, by means of which a footpedal applies the feeding pressure, and this pressure may be relieved on the up stroke, if desired. Power is supplied by a 1-hp. motor in the base.

## — 241 —

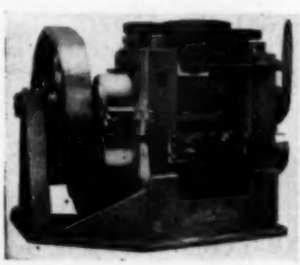
### Drawing Roll

*Rockford Iron Works, Rockford, Ill.* [Vol.71,p.947]

Although the drawing roll shown was designed particularly for drawing shovel blades after the shanks had been pierced and drawn, it can be adapted for almost any general-purpose drawing work by the substitution of suitable drawing dies.

The rolls, or rather the sections of rolls, are 30 in. in diameter and are made of 0.65-carbon steel, heat-treated. The roll necks are 10 in. in diameter and run in bronze-bushed bearings. The dies themselves are made of special alloy steel.

In operation, the rolls oscillate about 60 deg. A total adjustment of ¾ in. between rolls



is available. The lower gear and roll is driven by a crank or pitman. The upper roll is adjusted by a handwheel.

Power is taken from a 20-hp., high-torque motor. The flywheel is carried on four Timken bearings. The outside bracket carrying the flywheel is supported on an extension of the base.

## — 242 —

### Flexible-Shaft Equipment, High-Speed

*R. G. Haskins Co., 4636 Fulton St., Chicago, Ill.* [Vol.71, p.754]

Intended especially for the drop-forge die industry, this portable flexible shaft unit is sensitive and capable of grinding with small wheels and mounted points. One model, the HS-4, is equipped with a ¼-hp. 3,500 r.p.m. motor, and has Timken roller bearings.

The spindle shaft is of chrome-nickel steel, heat-treated. The spindle shaft and bearings are removed easily. All parts are interchangeable. Various combinations of pulleys can be furnished. The spindle has a small diameter at the wheel end. The outside of the spindle tube

has eight fluted grooves to give a hand grip.

Equipment includes ten different types of wheel mandrels. All attachments or special wheels fit the same spindle. Mandrels, wheels, and accessories are furnished with the grinder.

## — 243 —

### Forming Machine, Sheet-Metal, Electric, No. 172

*Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.* [Vol.71,p.680]

A sheet-metal working machine, which will handle metal up to 18-gage, and which is equipped with a built-in ¼ hp. motor operated from the ordinary lighting socket, is being manufactured. All of the general operations on sheet metal, such as burring, turning, wiring, crimping, beading, slitting, flanging, and elbow edging can be performed.

The frame houses the motor rigidly and incloses all gears and clutch parts. The clutch gives control either by a hand lever or a treadle, and can be locked for continuous operation.

The machine is sold complete with steel pedestal, clutch, ¼-hp. a.c. motor, electric switch, cord

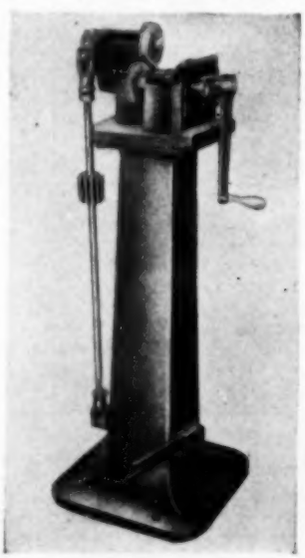
and plug, wrench, treadle for shaft motion, and treadle for clutch control. Standard rolls for burring, turning, wiring, beading, crimping, and slitting are carried in stock, with suitable gages for each operation. Flanging, elbow edging, and special rolls for other operations on sheet metal are made to specifications.

## — 244 —

### Graduating Machine, Rotary, No. 41

*Noble & Westbrook Manufacturing Co., 20 Westbrook St., East Hartford, Conn.* [Vol.71, p.518]

This machine is used for graduating and numbering micrometer collars in sizes up to 3½ in. in diameter. Any size of



collar can be marked without special gears, but a special die is required for each size of collar. With this equipment, a collar is graduated completely with a couple of turns of the handle.

Two spindles, adjustable from 0 to 3½ in., and controlled and kept in position by gearing, are the basic elements. The machine can be had for hand operation, or a bracket can be installed for mounting a clutch and motor.

Floor space, 18x18 in.; height, 40 in.; weight, 200 pounds.

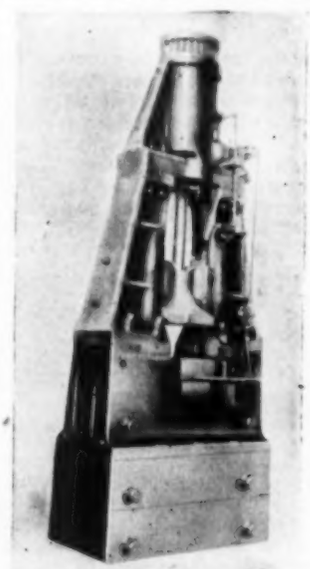
## — 245 —

### Hammer Drop, Steam, 24,000-Pound

*Chambersburg Engineering Co., Chambersburg, Pa.* [Vol. 71,p.948]

Although of standard design, the Chambersburg hammer has dimensions considerably out of the ordinary. It has a falling weight of 24,000 lb., a cylinder bore of 32 in., and a stroke of 52 in. The steam line is 7 in. in diameter and the exhaust, 9 in. The ram from front to back measure 66 in., and the distance between the guides is 42 in. The press has sufficient capacity to handle large size ingots after preliminary breakdown.

The guides of this hammer are extra wide and of the same type as those developed for the model H board drop hammer. The cylinder is lined, all valves are bushed, and all connections are fitted with roller bearings. The anvil is made in three sections to facilitate shipping and has a total weight of 482,000 lb.,



the upper section weighing 222,000 lb. The weight of the complete hammer is 662,000 lb. The overall height from the bottom of the three-piece anvil to the top of the head is 34 ft. 10 in. From the floor line, it stands 24 ft. 4½ inches.

## — 246 —

### Hammers, Chipping, Pneumatic, High-Speed

*Ingersoll-Rand Co., 11 Broadway, New York.* [Vol.71,p.1026]

Five high-speed pneumatic chipping hammers have been developed. The smallest hammer will chip and clean aluminum castings, whereas the largest is suitable for heavy-duty work on steel castings and alloy steel billets.

A feature of these hammers

is the use of a plate valve of the "flapper" type. Another feature is the throttle valve of a combined piston and poppet type. It gives a fine graduation of the port opening and remains tight for a long period of service.

Open-type handles are standard on these chippers. The exhaust is through the side of the barrel and can be deflected in any desired direction.

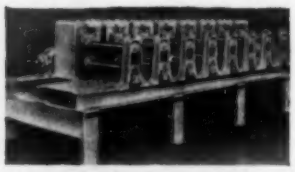
These hammers are made in the following strokes: Size 000, $\frac{3}{4}$ in.; size 100, 1 in.; size 200, 2 in.; size 300, 3 in.; size 400, 4 in. It is claimed that the high speed of these hammers makes possible a very smooth cut.

## — 247 —

### Mill, Metal-Forming

*Farrel-Birmingham Co., Buffalo, N. Y.* [Vol.71,p.565]

The metal-forming mill is of a design conforming closely to the design of continuous mills for rolling hot bar and strip. Each stand of the mill is an individual unit. The stand houses the spindle bearings, the connecting gears, and the mechanism for adjusting the roll centers. Both the stand



and the gear drive unit are fitted throughout with anti-friction bearings and are lubricated automatically.

The wedge, which is free to move in and out, is inserted between the top-roll spindle saddle and the housing cap. Its movement is controlled by the horizontal screw with the hexagonal head on the outside. Semi-steel is used instead of cast iron for castings. The steels used are heat-treated and of alloy analysis.

## — 248 —

### Molding Press, Hydraulic

*Busch - Sulzer Bros., Diesel Engine Co., 3300 South 2nd St., St. Louis, Mo.* [Vol.71,p.871]

Small parts that lend themselves to plastic molding can be produced rapidly and economically on the hydraulic molding press developed by W. G. Altpeter and D. V. Waters, development engineers of the Western Electric Company, by employing certain features covered in patents issued to G. Howlett Davis. It consists essentially of two presses in one, a main press incorporating the heating station, and a sub-press embodying the cooling station, with a table revolving about a central column to transfer the mold from one to the other.

The heating station is at the rear. It consists of an upper stationary platen and a lower platen, which is raised by the main hydraulic ram and lowered by hydraulic pull-backs. When the lower platen is raised, it lifts the mold from the revolving table and presses it against the upper platen. Both platens are equipped with steam heating channels that heat the molds by conduction.

The cooling station is of tilting head construction, and is similar to the heating station, except that the upper platen is attached to a tilting head

equipped with hooks for lifting the upper half of the mold. The capacity of the sub-press ram is less than that of the main ram, since it is used only during cooling, and to close and strip the molds. The platens at the cooling station are equipped with water-cooling channels.

There are two sets of dies in constant use. While one mold is being heated, the other is being cooled, unloaded, and refilled for the succeeding cycle. Operating times for both platens are approximately equal, so the only time lost is consumed in rotating the table.

This press may be built in very large capacities without becoming unwieldly. Using 150-lb. steam pressure, operating temperatures are reached in 20 minutes.

The control levers are interlocked to prevent false operation. All hydraulic valve controls are grouped conveniently at the left. A timing device, if desired, may be added. The tilting head is hydraulically operated, but the hooks are manually operated.

## — 249 —

### Shape-Cutting Machine, Automatic, Six-Torch

*General Welding & Equipment Co., 66 Brookline Ave., Boston, Mass.* [Vol.71,p.224]

This six-torch shape-cutting machine is intended for the automatic cutting of parts for industrial products from steel plate or pre-forged steel billets. Work is placed on a framework attached to the table, on which is mounted the templet of the part to be produced. A tracing point, carried on an arm of the

machine, is used to follow the outline of the templet. Through a pantograph mechanism, the motion is transferred to the arm carrying the six oxy-acetylene torches that do the cutting. These torches cut out the parts along the line of travel, six at a time. Shapes are cut to size within $\frac{1}{32}$ inch.

## — 250 —

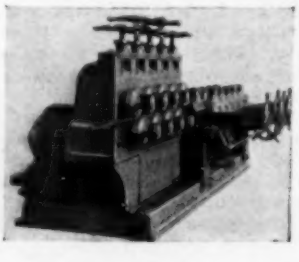
### Straightening Machine, Roll, No. 3A-18

*Kane & Rooch, Inc., Syracuse, N. Y.* [Vol.71,p.1020]

A line of redesigned combination vertical and horizontal roll straighteners is made in seven sizes, the horizontal roll shaft and vertical roll shaft units being furnished with 8, 19, 12 or 16 rolls to each unit. The sizes are comparable in capacity with the corresponding size numbers of the eight-roll straighteners manufactured by the company.

The rolls are designed to handle rounds, flats, squares, angles, U-bars, V-bars, hexagons, octagons, I-beams, railroad rails, pipe, special shapes, and hot-rolled window casings. The machines have a delivery speed of from 100 to 300 ft. per minute.

The roll shafts are of special analysis, chrome - manganese steel. Reduction and drive gears are of forged steel. Heat-treated gears are installed



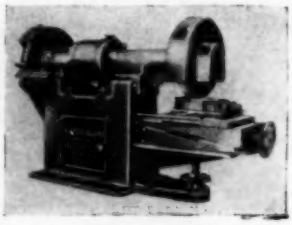
where required. Drive pinions are likewise of a special forged steel, heat-treated and ground. The machines are equipped with Alemite lubricating systems.

## — 251 —

### Wedge Reclaimer, Railroad-Journal, Electrically-Driven, Type F-B

*Hammond Machinery Builders, Inc., Kalamazoo, Mich.* [Vol. 71,p.519]

The F. B. journal wedge reclaimer is a device for grinding the correct radius on both new and worn journal wedges. It consists of a profile block, the top of which is machined to the correct radius. On this surface a chuck that will hold all stand-



ard A.I.A. wedges is fitted. This chuck is guided under the wheel by means of a feather key.

The amount to be ground from the wedge is controlled by the handwheel which moves the adjusting block between the profile block and the base of the machine on an inclined way.

The wedge-reclaiming end of the machine can be raised and lowered by means of a vertical screw and handwheel. The right-hand side is fitted with a concave wheel.

The motor is of 5 hp., totally inclosed. An automatic motor starter in the pedestal is standard equipment.

## — 252 —

### Wrench, Pneumatic, Rotary, No. 278

*Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill.* [Vol.71,p.951]

The No. 278 rotary pneumatic wrench for operation at 170 r.p.m. has been placed on the market. A feature is that heavy-duty ball bearings are used at all vital points. A removable rotor liner is applied. The device has a long drive shaft which has been found desirable on such work as removing caps from flexible locomotive staybolts. The machine has sufficient power to remove these caps when they are rusted

in. The long length of the drive shaft is of particular advantage when reaching in to get at the

throat sheet. The No. 278 wrench will break nuts loose from cylinder studs without backing the studs out. Dome nuts, superheater units, and frame bolts can be handled with this device. Net weight, 40 pounds.

— 253 —

### Bending Attachment

*Buffalo Forge Co., Buffalo, N. Y.* [Vol.71,p.514]

This attachment for application to bending machines or rolls can be used for both "leg-in" and "leg-out" bends. No preliminary bending is necessary. It also serves as a gage

and in opening up rings bent to too small diameters.

The attachment will handle angles, channels, beams, flats on edge, bars, squares, pipes, tubing, and sheets.

## *Balancing, Gaging, and Testing Equipment*

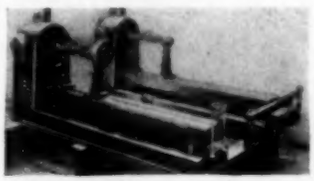
— 254 —

### Balancing Machines, Static and Dynamic

*Alfred Suter, 200 5th Ave., New York, N. Y.* [Vol.71,p.571]

These machines are equipped with magnetic means for counterbalancing the out-swing of unbalanced parts. They are guaranteed to be sensitive to 0.002 mm. deviation of the center of gravity from the rotating axis. Losenhausenwerk Dusseldorfer Maschinenbau, A.G., Dusseldorf - Grafenburg, Germany, is the maker.

The dynamic balancing ma-



chine consists of a heavy cast-iron base having a box section at the left containing the driving mechanism and indicating equipment. Drive of the work is effected by a variable-speed motor. The electric balancing device consists of a current breaking system and a double magnet for creating the magnetic field. Balancing of the rotating part occurs when the out-swing of the piece is offset by the magnetic impulse. The magnetic impulses are governed so that at balancing they are directly opposite the heavy spot.

The static balancing machine resembles the dynamic machine, but the axis of rotation of the frame is parallel with the axis of the test piece. The magnetic armature as well as the opposite end of the spring suspension are fixed at the bearing support of the oscillating frame.

The machines are built in three sizes, measuring out-of-balance from 75 to 10 kg., 200 to 15 kg., and 800 to 60 kg., respectively. The greatest lengths held are 1,000, 1,200 and 1,500 mm., and the greatest diameters, 500, 600 and 800 mm. The weights are 1,100, 1,400 and 2,000 kg., respectively.

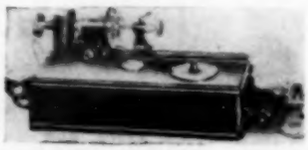
— 255 —

### Testing Machine, Static Unbalance Type S.K.I.

*Alfred Suter, 200 5th Ave., New York, N. Y.* [Vol. 71,p. 1062]

The type S.K.I. balancing machine has been introduced into the United States by the above agent. The machine is manufactured by Losenhausenwerk Dusseldorfer Maschinenbau, A.G., Dusseldorf-Graftenburg, Germany. It will measure out-of-balance down to 80 grams and up to 500 grams, and the displacement of the center of gravity to 250 mm. Direct current is required for driving the machine.

The machine consists of a cast-iron housing for the motor and a swinging pendulum supported by two compression swinging springs. A mandrel



serves to hold the test pieces. The device is provided with a dial for indicating the out-of-balance, a dial for indicating the out-of-balance plane, a resistance, an indicator for the out-swing, and a set of springs.

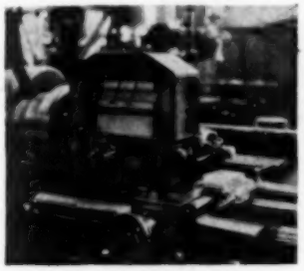
The electric balancing mechanism consists of an interrupter which rotates with the driving mechanism, and which is connected with a double magnet. By the proper regulation of the interrupter, the magnetic impluses can be controlled so as to be directly opposite the mechanical out-balance swing and counteract it entirely.

— 256 —

### Measuring Device, Turning-Tool Pressure

*Alfred Suter, 200 5th Ave., New York, N. Y.* [Vol.71,p.300]

A device for measuring and recording the pressure on turning and drilling tools is being made by Losenhausenwerk Dusseldorfer Maschinenbau, A.G., Dusseldorf - Grafenburg, Germany, and being marketed in the United States by the above agents. The manufacturer claims for the device the automatic measuring and recording of created forces in machine-tool operation, flexibility in attachment, and ease of transfer. The device is used for measuring pressure on turning tools. A similar recording instrument attached to a drilling machine testing table is used for measuring the pressure applied to drills. The device is obtainable



in sizes varying from a vertical pressure of 3,300 to 22,000 lb. per sq.in., while the drill-pressure measuring device is available in three sizes varying from 5,500 to 22,000 lb. per sq.in., in drill pressure. Pressure components are registered on a roll of paper by means of the "Threefold Recording Device."

Tests of manifold character can be made with this apparatus, one of them being the obtaining for a particular material the most favorable cutting angle in connection with a practical cutting speed without considering the feed, or at a pre-determined cutting width, the object being to make the tool edge last as long as possible.

— 257 —

### Testing Machine, Hardness, Ball, Portable

*Alfred Suter, 200 5th Ave., New York, N. Y.* [Vol.71,p.338]

Portability is the chief feature of the hand-type ball-testing apparatus manufactured by the Losenhausenwerk Dusseldorfer Maschinenbau, A.G., Dusseldorf- Grafenburg, Germany, and marketed in the United States by the above agent.

The instrument is operated by hydraulic means. Its design

makes it possible to arrange the tester for many uses. All models can be carried. Testing height can be adjusted from zero to the maximum. A small crank serves for producing the load indicated on a manometer. The standard unit is built for 1,650 and 6,600-lb. pressure.

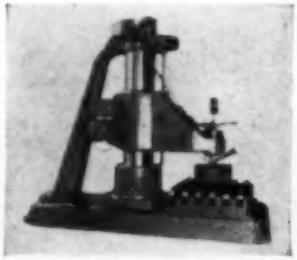
The main body is made of a special light alloy. All bright parts are nickeled, while other parts are enameled. The standard 1,650-lb. range tester weighs 16.5 lb., and the 6,600-lb. size, 55 pounds.

— 258 —

### Testing Machine, Brinell Hardness of Die Blocks, Direct-Reading

*Pittsburgh Instrument & Machine Co., 1026 Reedsdale St., Pittsburgh, Pa.* [Vol.71,p.418]

Embodying a direct-reading Brinell head mounted in a radial drill frame and adapted for making Brinell hardness tests on large die blocks and other pieces, this hardness-testing machine is a composite. A Bickford radial drill was used for the housing and the Brinell



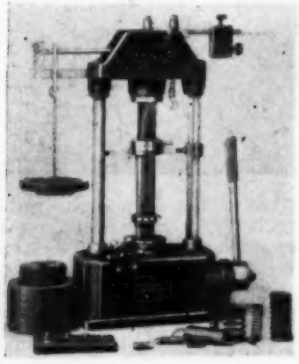
head was built into it by the above company, a Wilk direct-reading Brinell instrument being used. The operator takes the readings directly from a graduated glass scale on a ground glass screen while the test piece is under pressure. The rolls in the table facilitate handling of the work during the testing operations.

— 259 —

### Testing Machine, Spring, "Elasticometer," Type R-80

*Coats Machine Tool Co., Inc., 110-112 West 40th St., New York, N. Y.* [Vol.71,p.420]

A different design of the pillar type of "Elasticometer" is being introduced to replace the former type RH-80 elasticometer testing machine. The machine is used for compression and tension tests of springs up



to 170 lb. The ratio of this scale is still 1 to 10.

An adjustable stop, in ring form, to the left of the hand lever may be set to any given length of compression or in order to permit the rapid inspection of large quantities of duplicate springs. A balance weight makes allowance for the weight of the spring being tested in tension tests. The machine may be used for loads varying from ¼ oz. to 170 lb. The maximum distance between the compression and tension hooks is 8 in. and the maximum spring diameter accommodated is approximately 2⅜ in. Space required 22x16x7 in., weight, 7 pounds.

— 260 —

### Gage, Hole, Small, Model 36

*Federal Products Corporation, Providence, R. I.* [Vol. 71,p.220]

The small hole gage, Model 36, is intended for measuring roundness and size variations of small holes from ⅜ up to 1½ in.

The gage can be operated from either side, and the parts can be gaged rapidly. The indicator is graduated in 0.0001 in. around the 2¾-in. dial, and the graduations representing 0.001 in. are ⅜ in. apart. Jaws are available in four sizes, ⅜ to ½ in., ½ to ¾ in., ¾ to 1½ in., and 1½ to 1½ inches.

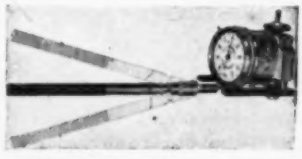
— 261 —

### Gage, Cylinder, Junior

*L. S. Starrett Co., Athol, Mass.* [Vol.71,p.380]

To meet the demand for a cylinder gage to measure small bores, the No. 542AA Junion Cylinder Gage with the Starrett patented feature has been designed.

The capacity is from 1⅞ in.



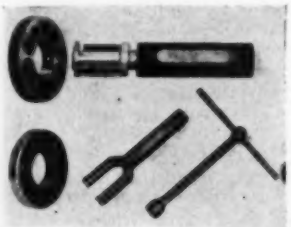
to 2½ in. It has hardened and ground steel sled and contact points. The double-spring action makes the gage self-centering and non-collapsible. The adjustable dial, marked plus and minus, is calibrated by thousandths. The handle may be shifted as indicated.

— 262 —

### Gage, Plug, Plain Adjustable

*John Bath & Co., 18 Grafton St., Worcester, Mass.* [Vol.71, p.492]

Equipped with four adjustable jaws to compensate for wear, this improved plain plug gage has greater service life. The gage is adjusted by means



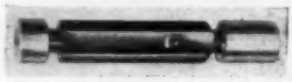
of a special wrench. A master ring is also furnished as a reference standard. Its accuracy is plus or minus 0.00005 in. The gage is obtainable in the standard sizes.

— 263 —

### Gages, Plug and Ring, Plain

*Brown & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.761]

Conforming to the standards specified by the American Gage Design Committee, these plain cylindrical plug gages and plain ring gages have been placed on the market. The No. 659 cylindrical plug gages may be had with both single-end and double-end handles within the range of



the respective handles. The plugs are made in two styles. Style 1, the "go" gage, is made with a larger measuring surface. Style 2, is the "not-go" gage. The gages are made in a range of sizes from 0.241 to 1.510 in. in diameter.

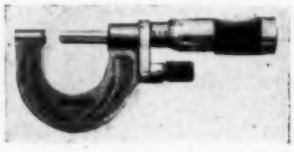
The No. 664 plain ring gages are made in two different styles, with a range of sizes from 0.241 to 1.510 in. in diameter, inclusive. The smaller rings, ranging in size from 0.241 to 0.510 in., are made in two-piece construction with a hardened, ground, and lapped bushing inserted in a soft gage body. The larger rings, ranging in size from 0.511 to 1.510 in., are made of solid stock, hardened, ground, and lapped.

— 264 —

### Micrometer Caliper, No. 24

*Brown & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.910]

Measuring to ten thousandths of an inch can be made by the No. 24 micrometer caliper. This tool, which has a range of 0



to 1 in. reads ten-thousandths directly. As usual, the thousandths are read from the barrel and the thimble and the readings in ten thousandths are read directly from a smaller lower thimble. The widely spaced graduations on this small thimble permit parts of ten thousandths to be estimated.

This micrometer caliper is used and operated in much the same way as the conventional 1-in. micrometer. The No. 24 caliper is of simple construction, and has no gears nor intricate parts to get out of order.

— 265 —

### Micrometer Caliper, No. 54

*Browne & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.912]

A wide range of measurement is found in the No. 54 micrometer caliper, especially adapted for use in the automotive service shop where its range of 0 to 4 in. by thousandths includes practically all automobile parts

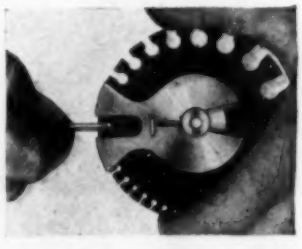
requiring close measurement. The measurements are obtained through the use of four interchangeable anvils of different lengths.

— 266 —

### Wire Gage Selectors

*Browne & Sharpe Manufacturing Co., Providence, R. I.* [Vol.71,p.1066]

Two wire gage selectors designed to simplify the gaging of wire have been placed on the market. They are known as Nos. 698 A and 698 B, respectively. These selectors cover



up the slots in the wire gage adjacent to the one being used, so that the one slot in the wire gage for any particular size is made accessible for fast and easy gaging of many pieces.

## *Electrical Equipment*

— 267 —

### Motor, Single-Phase, "Red Band"

*Howell Electric Motors Co., Howell, Mich.* [Vol.71,p.219]

Simplicity of design and construction is the outstanding characteristic of this brush-less, single-phase motor. Construction features approximate those of squirrel-cage type. The only auxiliary equipment used in the operation of the unit is a start-

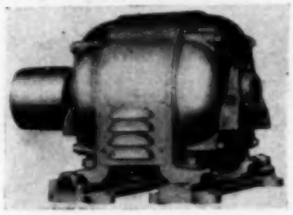
ing box, containing starting condensers and an automatic contactor that disconnects the condensers as the motor comes up to speed. Because of this, the motor has no brushes, commutators, internal switching devices, nor wire-wound rotor. The motor can be reversed at full speed without injury.

## — 268 —

### Motors, "Uniclosed"

*U. S. Electrical Manufacturing Co., Los Angeles, Calif.* [Vol.71,p.337]

Although not totally inclosed, the "Uniclosed" motor is provided with a pressed-steel housing, embodies a dual fan blast, operates on the "AutoStart" principle, and has a solid die-



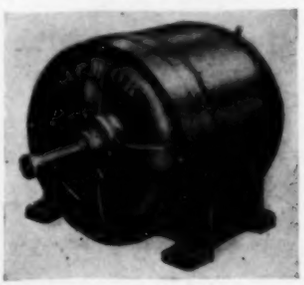
cast aluminum rotor and ball bearings. It is offered for installations that require protective closed-frame motors. A feature of the design is the cover which can be removed quickly by loosening four screws. This exposes the air passages for inspection and cleaning. There is no direct exposure of the windings. Internal parts are shielded from water and dust.

## — 269 —

### Motors, Fan-Cooled, Totally-Inclosed, "Type C"

*Armour Electric Manufacturing Co., Erie, Pa.* [Vol.71,p.339]

Heavy cast-iron end brackets are featured in the Type C totally-inclosed, fan-cooled polyphase motors. These brackets are designed to offer a maximum of protection against the entrance of explosive gases and abrasive substances into the motor and increase radiation of



heat by means of heavy ribs. The fan has a substantial hub. The caps, which hold Timken bearings, have fine grooves to supply grease. Provisions are made for taking air-gap measurements. Means are also provided for removing dirt from the interior. The Type C motor is built in sizes up to 50 horsepower.

## — 270 —

### Motor with Built-In Switch, Type "C"

*Reynolds Electric Co., 2625 W. Congress St., Chicago, Ill.* [Vol.71,p.381]

Fitted with a built-in switch which facilitates starting and stopping, a practically enclosed motor is claimed to give a tem-

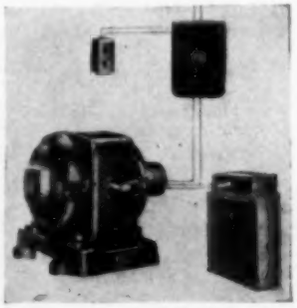
perature rise of less than 40 deg. C., adequate ventilation, and yet almost complete enclosure. These fractional horsepower motors are built in sizes ranging from $\frac{1}{16}$ to $\frac{1}{4}$ hp., and are of the split-phase induction type.

## — 271 —

### Motors, Capacitor, Squirrel-Cage, Single-Phase, Type KC

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.988]

Especially designed for quiet operation, these motors are suitable for driving blowers and ventilating fans, and for use on centrifugal machinery, low-pressure, pumping applications, wood-working machines, and



machine tools where the motor is built into the machine.

Although the KC motor is classified as a single-phase type, it is really a modified two-phase, squirrel-cage motor having a capacitor in series with one phase of the stator windings. This gives starting characteristics similar to the two-phase squirrel-cage motor; that is, it is self starting.

The constant-speed ratings available are from 1 to 25 hp., inclusive, at 3,600, 1,800, 1,200, and 900 r.p.m. with starting torque from 60 to 40 per cent of full-load running torque, depending upon the speed. The maximum torque available is approximately 200 per cent of full load torque.

## — 272 —

### Breakers, Overload, Bulletin 825

*Allen-Bradley Co., 286 Greenfield Ave., Milwaukee, Wis.* [Vol.71,p.647]

A complete line of Bulletin 825 overload breakers for fractional-horsepower d.c. and a.c. single-phase and polyphase motors has been announced. Protection is afforded by the breakers against motor burnouts and damage to the driven machines from overloads. The breakers have a maximum rating of 1 hp. at 125 volts and 1½ hp. at

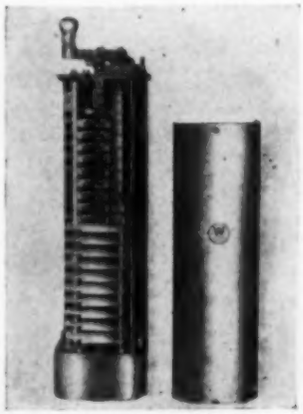
220 volts, and may be obtained with or without a snap switch or fuse clips. Six forms have been developed for various industrial applications.

## — 273 —

### Controller, Reversing Drum, Type "A"

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.71,p.185]

This line of reversing drum controllers, listed as Classes 8,300 and 8,400 for d.c., and as Classes 12-700 and 12-800 for a.c., is designed for operating cranes, hoists, and other heavy



work. Ball thrusts make operation easy.

The drum cylinder consists of rolled-brass supporting disks on a micarta insulated steel shaft between brass and micarta insulating collars. Contact segments are bolted to the supporting disks, and are reversible. Fingers are of the compensating, self-aligning type.

Several types of operating heads can be used and can be mounted in any of four positions. A safety latch is located in the handle.

## — 274 —

### Controller, "Reco"

*Reynolds Electric Co., 2650 W. Congress St., Chicago, Ill.* [Vol.71,p.988]

An unfailing control device to regulate operations, the timing of which can be predetermined, the "Reco" industrial control is suitable for the stopping, starting, and reversing of motors, for the automatic operation of signals, elevators, fire pumps, automatic doors, call systems, and danger signals.

The control is motor driven, the motor revolving a cylinder drum that is provided with adjustable contacts making contact with a goose-necked brush. The features are complete flexibility, giving any speed of timing desired, easy accessibility, and ease of installation and ad-

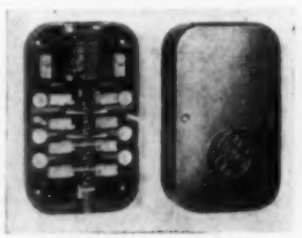
justment. The device is suitable for application to machine tools where the stopping and starting points can be predetermined.

## — 275 —

### Relay, Multi-Finger

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.187]

A relay, Cr-2820-1080, designed to meet the demand for a multi-finger, a.c. device, can be used as an interlocking device between motions. The relay consists of a series of double-break, silver-faced fingers, controlled by a small sole-



noid. The assembly is on a molded base adapted for use on panels. Clearance for 550 volts has been provided. The contacts will carry 15 amp. con-

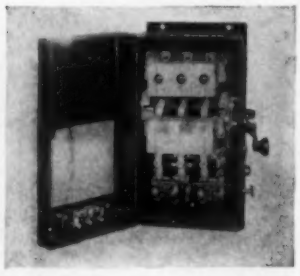
tinuously. By varying the arrangement of the contact fingers, the relay may be arranged for a number of applications.

— 276 —

### Starter, Combination

*Square D Co., Detroit, Mich.* [Vol. 71,p.221]

This combination starter for automatic electric-motor control is manufactured in three capacities in amperes, and in six types, making use of across-the-line starters up to 30 hp., 220 volts, and 50 hp., 440 and 550 volts, either two- or three-phase. Each



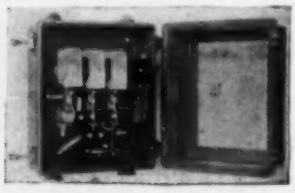
starter is a complete unit. A motor-circuit switch not only acts as a disconnecting switch, but also is capable of opening the circuit while the motor is under load. The starters are arranged for the insertion of a test jack in the motor-circuit switch while the motor is running. Units may be obtained with fuse blocks between motor-circuit switch and starter.

— 277 —

### Starter, Dust-Tight, "Linestarter"

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.71,p.418]

This weather-proof remote-control, non-reversing, across-the-line type of magnetic starter for single-phase and polyphase squirrel-cage induction motors, is especially adaptable for use in coke plants, cement mills, steel mills, and other places



where a dust-tight starter is desirable. A cast-iron cabinet is used with a gasket seal on the door. The conduit is brought in through the top and bottom in threaded openings to make a dust-tight and waterproof connection. All linestarters are equipped with the "Deion" grid-type arc quencher.

The dust-tight linestarter is now available in three sizes up to 50 horsepower.

— 278 —

### Starters, Bulletin 711-712

*Allen-Bradley Co., 286 Greenfield Ave., Milwaukee, Wis.* [Vol.71,p.835]

Standard a.c. across-the-line switches equipped with hand-operated disconnect switches and meter test jacks in one cabinet are now being made. The disconnect switches are furnished with or without fuse clips. The meter test jacks permit the motor to be tested for load without opening the switch cabinet or interfering with the machine operation.

These switches provide overload, dead-phase, and no-voltage protection. The Type A switch

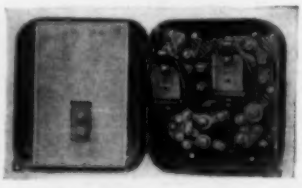
will disrupt a locked motor current. The Type B switch is a service switch that disrupts at 150 per cent full load current. The switches are rated up to 10 hp. for 110-volt circuits; 30 hp. for 220-volt circuits; and 60 hp. for 440- to 550-volt circuits.

— 279 —

### Starter, Automatic, Across-the-Line, Direct-Current

*Cutler-Hammer, Inc., 12th Street & St. Paul Ave., Milwaukee, Wis.* [Vol.71,p.989]

An automatic, across-the-line starter, for general application to d.c. motors up to 2 hp., 115 or 230 volts, has been announced. Important features are: Small size, low cost, double line break, thermal overload protection, low voltage protec-



tion, silver contacts, and a completely inclosed structure. Two magnetic contactors connect the motor directly across the line on starting. The contactors are designed especially for d.c. service. The thermal overload relays are the same as those used in the company's a.c. across-the-line starters.

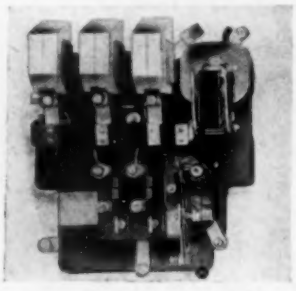
Each starter is furnished with a push-button master switch providing three-wire control. This master switch can be furnished mounted in the cover of the starter, or it can be arranged for mounting separately.

— 280 —

### Switch Without Cabinet

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.71,p.989]

In some machinery applications, it is desirable to mount the starter within the machine and in this case, the cabinet is not required. For such services, the unit of the improved



"Linestarter" without cabinet is supplied. This starter is also equipped with the "Deion" arc quencher and the thermal overload relay. Another feature is the combined hand and automatic reset thermal overload relay. This permits remote mounting.

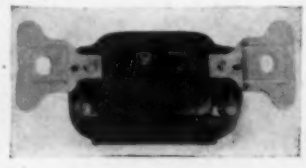
The Linestarter without cabinet may be obtained in three sizes covering a range up to 50 horsepower.

— 281 —

### Switch, Toggle, Rubber-Mounted

*Cutler-Hammer, Inc., 80 12th St., Milwaukee, Wis.* [Vol.71, p.35]

This switch is of the rubber-mounted, toggle-type for quiet operation, mounted upon soft-rubber pads, dust-proof construction, long life, non-stubbing contacts, a compression-type lubricated spring, and cold-molded insulating material for the body and the base. As soon as the lever is moved, the quick-acting mechanism gives contact. The switch is made in single- and double-pole, three- and four-way types, furnished with either black or brown operating levers and with standard mounting throughout.

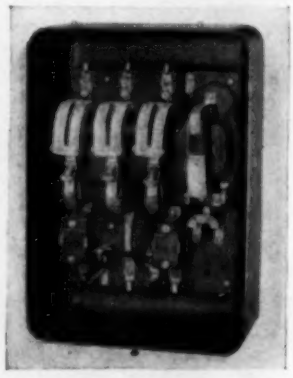


— 282 —

### Switch, Magnetic, No. CR-6005-D-30

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.220]

A magnet switch designed primarily for throwing small motors directly across the line, and known as the CR-6005-D-



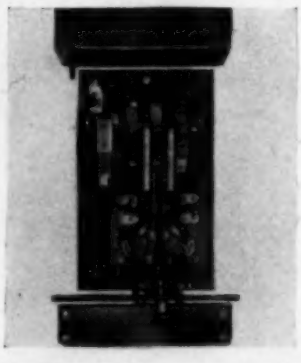
30, supersedes the CR-7006-D-4 type. It is suitable for use with small motors wherever a simple, direct control, with complete protection is required. A drawn-shell-type case incloses the switch. The reset button for the overload relays extends through a hole in the cover. Changes include the use of a molded shaft that will not stick, thermal overload relays with interchangeable heater units, silver contacts on the holding interlock, an E-frame magnet that requires a minimum of power, and restricted-type blowouts.

— 283 —

### Switch, Magnetic, Small-Capacity, CR-7006-V-7

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.341]

This oil-immersed magnetic switch of small capacity is suitable for use in highly corrosive gases or acids. It bears the



designation CR-7006-V-7. The switch has a capacity of 40 amp. and can be used with any motor, from 110 to 600 volts. Contactor and interlock are stand-

ard. The overload relay has oil-immersed contact tips.

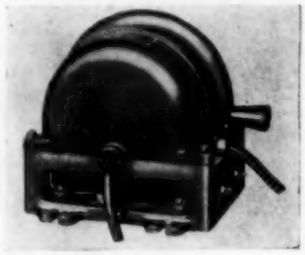
The inclosing tank is 4-in. sheet metal with a flange for wall mounting. The tank is provided with a felt gasket.

— 284 —

### Switch, Field Discharge

*Taft-Peirce Manufacturing Co., Woonsocket, R. I.* [Vol. 71,p.456]

The switch is designed to dissipate the high voltage surge induced in the windings of an unprotected circuit when the operator of a magnetic chuck throws the switch. By the use of this device, the puncturing of coil insulation is prevented.



It is now regular equipment on all Taft-Peirce "Superpower" chucks of size 1,134 and larger units.

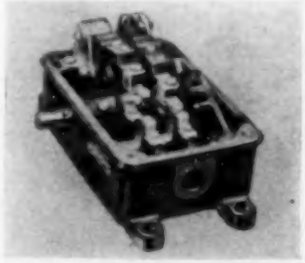
— 285 —

### Switch, Limit, Track-Type

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.836]

A cam-operated limit switch for industrial control applications has been developed. It bears the designation of LS-438 and supersedes the older types manufactured by the company.

This switch is inclosed in a cast case. Electrically, it is a two-circuit switch that by a simple adjustment can be made either normally open or normally closed, or one circuit open and one closed. It is a snap-action, cam-operated device and can be obtained with either spring or star-wheel return, with any one of four operating



levers: A roller lever with a 1- or 3-in. roller, a forked lever, or a straight lever. The contact tips are interchangeable with those of standard G.E. cam-operated master and geared limit switches.

— 286 —

### Switch, Starting, Splash-Proof

*Allen-Bradley Co., 286 Greenfield Ave., Milwaukee, Wis.* [Vol.71,p.838]

This splash-proof starting switch for a.c. motors on equipment where washing down is essential or excessive moisture is present, is also suitable for dusty situations.

The Bulletin 709WT splash-

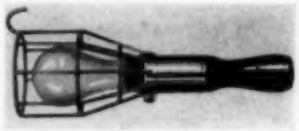
proof across-the-line starting switch gives complete overload, no-voltage, and dead-phase protection. It is rated up to 3 hp., 110 volts, and 5 hp., 220 volts, for single-phase motors, and up to 5 hp., 220 volts, and 7½ hp., 440-550 volts, for polyphase motors. The switch is furnished in three forms: Form 1—with push buttons in cover, Form 2—for external pilot control, and Form 3—with two-way lever switch.

— 287 —

### Lamp Guard, Electric-Welded, "Economy"

*Electric Portable Co., 879 E. Harrison Street, Portland, Ore.* [Vol.71,p.753]

The "Economy" lamp guard is a low-cost guard for portable lamps. It is made of steel wire, electrically welded, and according to the manufacturer, provides ample protection for lamps up to and including 50 watts.



The guard admits any standard, keyless, weather-proof socket, $1\frac{7}{16}$ to $1\frac{1}{2}$ in. in diameter, and may be purchased either with or without the socket.

## *Furnaces and Equipment*

— 288 —

### Furnaces, Heat-Treating and Carburizing, Inclosed-Front

*W. S. Rockwell Co., 50 Church St., New York, N. Y.* [Vol.71,p.301]

Working conditions and better heating are features of this furnace which is adapted to a wide range of heat-treating

operations, such as annealing, hardening, normalizing, carburizing, and drawing. The furnace may be operated on fuel or by means of electricity. Comfortable operation is maintained by including the heating chamber opening and door. Spent gases are discharged upward from the hearth level and utilized to preheat the air.

A hot hearth under the door opening is provided. The heating chamber is materially wider and higher then the working opening. The furnace is also built with an uncovered opening for heat-treating light stock that may be handled on trays or exposed on supports above the chamber hearth.

This furnace is built with a double refractory lining. It is furnished in a portable type. Both the under-fired and over-fired methods of heating are provided to suit temperature requirements and the nature of the heat-treating process. Burners for oil or gas may be located on the front, rear, or sides with provision for regulation from the front.

— 289 —

### Furnace, Heat-Treating, Pit-Type

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.338]

This electric furnace, especially designed to heat-treat aluminum alloys is a pit-type, cylindrical unit having two cir-

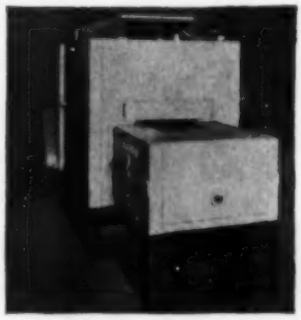
cuits; one, rated 220 volts, 3 phase with a Y-series connection is in the top; the other, in the lower side walls and bottom, is rated 220 volts, 3 phase with a Y-delta connection. At high heat the power consumption is 84 kilowatts.

— 290 —

### Furnace, Heat-Treating, Conveyor-Type

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.340]

This is a conveyor-type electric furnace for heat-treating small parts. It is of rectangular form, about 8 ft. long, 4 ft. wide, and 4½ ft. high, over-all. A small insulated housing is provided for the feed end of the belt to prevent unnecessary heat losses. The principal feature of the furnace is the mesh-belt conveyor, made of heat-resisting alloy. The furnace can be adjusted for various speeds and



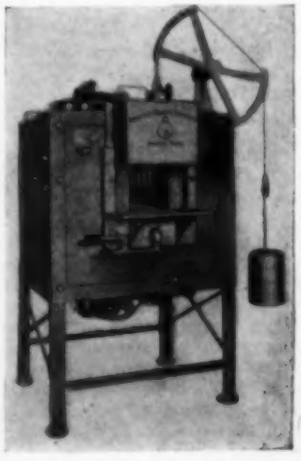
temperatures, and an adjustable opening at the feed end accommodates work of different dimensions. After heat-treating, the work is discharged into a chute.

— 291 —

### Furnace, Electric, High-Speed, Type H B

*American Electric Furnace Co., 27 Von Hillern St., Boston, Mass.* [Vol.71,p.419]

Having a patented atmospheric control feature, this electric furnace for heat-treating high-speed steels has an operating



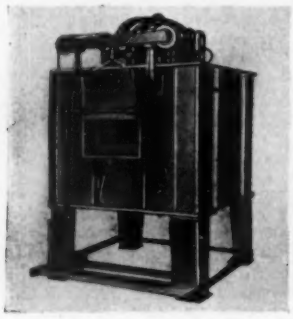
range to 2,500 deg. F. Globar heating elements are used. Terminals are water-cooled. The furnace is obtainable in three sizes in capacities varying from 28 to 60 kw. and hearth sizes from 8 to 16 in. wide, 16 to 30 in. deep, and 8 to 12 in. high. Weights vary from 1,800 to 5,000 pounds.

— 292 —

### Furnace, Electric, High-Temperature, Type SV

*Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit, Mich.* [Vol.71,p.799]

Furnace units of the SV type, suitable for hardening high-speed and alloy steels at a maximum temperature at 2,500 deg. F. employ "Globar" heating elements placed vertically in two rows in the side walls and extending slightly below the hearth. The charge thus receives side heat principally. The



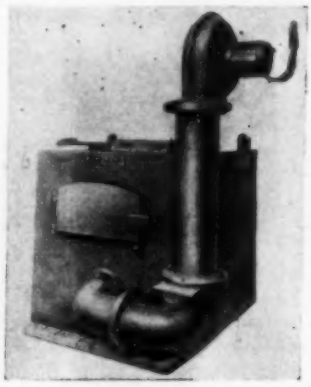
Type SV furnaces are suitable particularly for uniform heating of tools held in vertical or horizontal positions. They are recommended where an exceptionally deep hearth is required for heating long slender tools. The furnaces can be arranged for 110- or 220-volt, single phase, or three-phase a.c. or d.c. circuits. Other standard types of furnaces for heating flat pieces are also available in different capacities. A special sealing mechanism keeps the chamber gastight. The smallest size single-phase furnace has an effective hearth area of 8x16 in.; the largest size furnace has a hearth 16x28 in. in area.

— 293 —

### Heaters, Core-Oven, Coke-Fired

*Young Brothers Co., 6500 Mack Ave., Detroit, Mich.* [Vol. 71,p.908]

Uniformity of heat distribution and production of 113 to 154 pounds of molds per pound of coke can be obtained by the use of this oven in connection with a foundry core and mold-drying oven. The unit heater is a small, box-type, self contained furnace built of firebrick and incased in cast iron. It is supplied by a blower installed



in its air intake line. Breeze or fine coke may be used in this heater. The unit heater is also adapted to oil and other types of fuel. The baking temperature of 750 deg. F. is reached 2½ hours after firing. The unit heater is built in three standard sizes, designated as the Nos. 2, 3, and 4. The capacities are 2,500, 5,000, and 6,500 cu.ft., respectively.

— 294 —

### Heat-Resisting Pot, "Niclad"

*Flannery Manufacturing Co., Flannery Bldg., Pittsburgh, Pa.* [Vol.71,p.683]

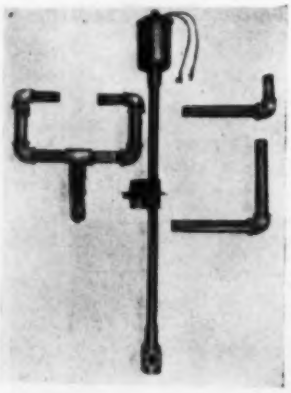
A heat-resisting pot of ductile pressed steel, covered with a heavy layer of non-oxidizing metal, is being manufactured. The manufacturer claims uninterrupted service for this container for indefinite periods, and practical immunity to the action of cyanide, salt, and caustic baths. The inside of these pots consists of a low-carbon steel or ingot iron form-drawn from a solid sheet, while the outside is built up of nickel or some other heat-enduring metal or alloy. The pots are claimed to have high thermal conductivity.

— 295 —

### Quenching Tank Agitator

*Stanley P. Rockwell Co., 296 Homestead Ave., Hartford, Conn.* [Vol.71,p.790]

For forcing a stream of quenching liquid (oil, water, or brine) against the face or faces of dies, assuring uniform hard-



ening because of freedom from air bubbles, the quenching tank illustrated will agitate the quenching bath and keep it at a uniform temperature throughout. Furthermore, it is of use in fire protection as it pumps the cold liquid at the bottom of the tank to the top, thereby keeping the quenching oil at the top at a safe temperature.

The device weighs 16 lb., and has a vertical adjustment of 26 in. It can be attached instantly to any quenching tank, and is arranged for 1-in. standard pipe fittings. The motor is a standard 110-volt, 60-cycle, 10,000 r.p.m. type driving a specially-designed screw pump, ball-bearing equipped and using brass fittings.

— 296 —

### Pyrometer, Optical, "Pyroversum"

*Maco Template & Engineering Co., Ltd., 19 Crusitor St., London, E.C.4, England.* [Vol. 71,p.418]

"Pyroversum" is the name given to an optical pyrometer suitable for the foundry and the workshop. It may be used for obtaining the heat of molten metals and the temperature of red-hot tools.

The instrument consists of a

frame 8½ in. long by 1 in. wide which carries a special glass throughout its length. On one side of the frame is a scale 5¼ in. long, registering every ten degrees from 550 to 1,200 deg. C., or if desired it may be calibrated for Fahrenheit readings.

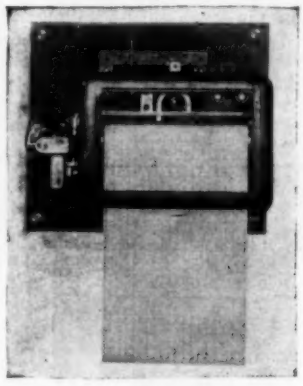
The American agent is Charles Mitchell, Cornish Arms Hotel, West 23d St., New York City.

— 297 —

### Pyrometer, Recording, Potentiometer-Type, Model 8201

*Wilson-Maeulen Co., 383 Concord Ave., New York, N. Y.* [Vol.71,p.870]

In this potentiometer recorder, when the measured voltage from the thermocouple changes as a result of temperature change at the thermocouple, the galvan-



ometer pointer deflects in the corresponding direction. At intervals of 10 seconds, the carriage moves the pen.

The three chart speeds are ¾, 1½, and 3 in. per hour. Charts are available in a wide selection of scale ranges in both the Fahrenheit and Centigrade systems. For low temperature, operations, 600 deg. F. down to zero or lower, this same recorder is supplied to operate as an electric thermometer employing resistance bulbs.

An external drive unit, consisting of an ample sized motor and double worm-and-gear speed reducing system located outside the instrument case, furnishes power to the instrument mechanism. The drive unit is supplied for either 110- or 220-volt a.c. circuits.

## *Material Handling Equipment*

— 298 —

### Truck, Lift, Electric, Type E Q

*Elwell-Parker Electric Co., Cleveland, Ohio.* [Vol.71,p.530]

This electric lift truck, having a capacity to handle 3,000 lb., affords a means of transporting skid boxes or tote pans at three times the walking pace of hand truckers. It is built to turn the corners of 4-ft. aisles, and work in congested quarters. Drive is effected by an inclosed, motor-driven, worm-type full-floating axle. The frame is mounted on springs.

This truck is 28½ in. wide by 83 in. long and low over the battery compartment, although the controls are retained at the usual height.

The lift platform is a single

¾-in. plate bent and welded into a rigid skid support. The present standard size of the platform is 18x41 in., and the height is 7 in., the lift being 3½ in. Timken bearings are employed on the steerable train wheels.

**— 299 —**

### Lift Truck, "Footlift"

*Lewis-Shepard Co., 117 Walnut St., Watertown Station, Boston, Mass.* [Vol.71,p.951]

As the name implies, the "Footlift" lift truck is operated by stepping onto the lifting mechanism, the workman's weight lifting the load into the proper position for transportation. It is simple in construc-

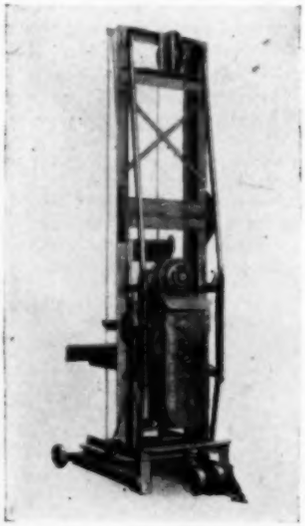
tion, has several safety features, and a vertical release check. The handle is used only for steering and hauling. It is never connected with the load. The capacity is 3,500 pounds.

**— 300 —**

### Elevator, Portable, "Red Giant"

*Revolvator Co., 336 Garfield Ave., Jersey City, N. J.* [Vol. 71,p.792]

Capacity to lift up to 2,000 lb. at a rate of 35 ft. per minute is found in the Model M "Red Giant" portable elevator. Other models are available of similar construction for loads up to 6,000 lb. The speed of 35 ft.



per minute is obtained by the use of a silent-chain, spur-gear drive.

The features of the hoist are the inclosed hoist unit, Z-bar upright construction, and the floor-lock.

The dumping type of floor-lock has a vertical lift and the pull handle is detachable so that it may be laid on the floor, stood up against the machine or turned around to one side to be out of the way, and lift and lower the elevator within an arc of 200 deg. The Revolvator is electrically welded throughout.

**— 301 —**

### Hoist, Electric, "Handy Andy"

*Handy Hoist Co., 847 W. 120th St., Chicago, Ill.* [Vol. 71,p.718]

A low-headroom electric hoist, known as the "Handy Andy," is simple and compact in design and weighs only 160 lb. It is 24 in. in length and 7½ in. in diameter. The lifting

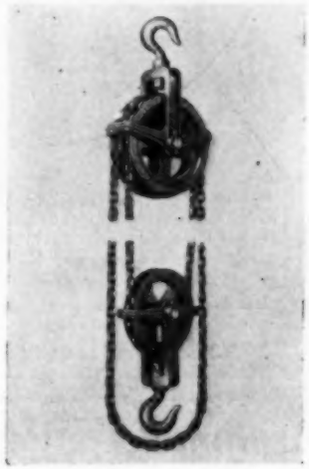
capacities are 500, 1,000 and 1,500 lb. It is fully-inclosed. The entire gear mechanism, as well as the drum type switch, may be taken out easily by removing the end plate. The hoist is equipped with a 110-volt, universal motor.

**— 302 —**

### Hoist, Chain, Differential

*Robbins & Myers, Inc., Springfield, Ohio.* [Vol.71,p.905]

The three features of the differential chain hoist are Timken thrust bearings on the lower hook, sheaves of an alloyed iron of high strength and unusual hardness, and aluminum finish throughout except on the chain. The chain is a special-



analysis steel, heat-treated and electrically welded. The hooks are forged steel, heat-treated, and swivel freely, while the frames are of heavy malleable iron pieces of high tensile strength.

The hoist is manufactured in five sizes, in capacities from ½ to 2 tons, inclusive. The regular lifts range from 6 ft. for the ½-ton size to 9 ft. for the 2-ton size.

## *Painting Equipment*

**— 303 —**

### Paint Sprayer

*Binks Manufacturing Co., 3114 Carroll Ave., Chicago, Ill.* [Vol.71,p.379]

This all-purpose spray painting and finishing outfit is made for general utility work. It is a complete unit equipped with a quart metal container and a pressure-cup spray gun. The air compressor unit is belt driven by a ¼-hp. G.E. motor. This

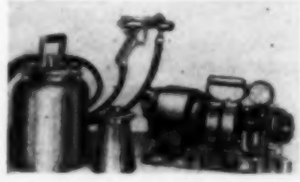
unit has a capacity of 2.16 cu.ft. of air per minute. Ten feet of rubber-covered electric cord, attachment plug, and ten feet of air hose are attached.

**— 304 —**

### Paint Sprayer, "All-Purpose"

*Electric Sprayit Co., 320 E. Colfax Ave., South Bend, Inc.* [Vo.71,p.568]

Designed to meet the demand for a portable electric hand sprayer which has a pressure-feed container, and which is suitable for covering wide surface and for all types of commercial and production work, this outfit consists of a rotary compressor of special design operated through a direct drive by a ¼-hp. motor. The pressure-



feed tank holds approximately 2 gal. of material. A one-quart container is also furnished and can be connected to the gun for small touch-up and trimming jobs. A commercial gun completes the equipment.

The complete outfit weighs approximately 50 lb. Twelve feet of electric cable and 20 ft. of rubber hose are provided, as well as 8 ft. of air and paint hose. The sprayer is also obtainable with a gasoline engine. This self-powered unit is of the same design as the electric model and weighs approximately 70 lb. A ¾-hp. air-cooled engine is used for supplying air under pressure.

**— 305 —**

### Paint Sprayer, Portable, Electric, "Tornado"

*Breuer Electric Manufacturing Co., 852 Blackhawk St., Chicago, Ill.* [Vol.71,p.909]

This compressor-type paint spraying machine is designed for touch-up work, shading, light finishing and refinishing jobs, as well as semi-production and maintenance industrial painting work. The unit is powered by a ¼-hp. universal motor and develops a pressure

of 35 lb. per sq.in. The compressor unit weighs 7 pounds.

The "Tornado" spray gun is equipped with two tips, one slotted for fan spray and the other for a narrow spray covering 2 to 14 in. An adjusting screw controls the amount of paint. The gun weighs 2 lb. The Tornado paint spraying outfit complete consists of a quart container, two tips, 20 ft. of reinforced, rubber-covered cord, and 8 ft. of rubber, web-covered connecting hose.

**— 306 —**

### Paint Removing Machine, Pneumatic

*Paasche Airbrush Co., 1909 Diversey Parkway, Chicago, Ill.* [Vol.71,p.340]

For removing rust, scale, and loose paint from surfaces preparatory to painting, this air motor cleaner is for use with portable airpainting equipment. The device may be attached to any air supply and operated at a slow or fast speed by regulating an air valve. The unit

uses a 4 x ¾ in. wire brush or a 6 x 1-in. brush. The net weight is 10 lb. and the unit is 11 in. long by 4½ in. in diameter.

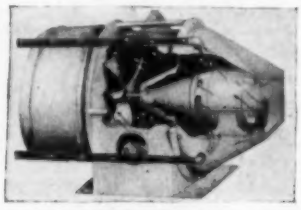
— 307 —

### Ventilating Unit, "Explosion Proof" Type F 532

*Paasche Airbrush Co., 1909-1923 Diversey Parkway, Chicago, Ill.* [Vol.71,p.1020]

An improved type of the "Explosion Proof" ventilating unit has been placed on the market. The improvements consist of a warm-air outlet and cold-air inlets to the motor, a sprinkler head funnel, and complete inclosure of the motor. The ventilating unit is designed for use in all finishing operations to minimize fire and explosion hazards.

The motor housing is designed so that the inlet openings may be placed in the horizontal or vertical positions with the inlet to the right or to the left, top, or bottom. The motor employs sealed sleeve bearings.



A specially designed fan is a feature.

Ventilating units are supplied in four sizes, displacing 3,200, 5,000, 9,000 and 15,000 cu.ft. of free air per minute at 1,750 r.p.m. The motor sizes recommended are ¾, ½, 1, and 2 hp. for the cubic displacements above.

Weights range from 80 to 160 pounds.

## *Polishing Equipment*

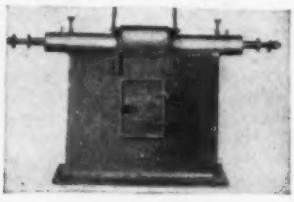
— 308 —

### Buffer and Polisher, Two-Motor "Rite Speed"

*Standard Electrical Tool Co., 1938 N. 8th St., Cincinnati, Ohio.* [Vol.71,p.304]

This two-motor buffer and polisher is made in 3-, 5-, and 7½-hp. sizes. Any speed from 2,000 to 3,000 r.p.m. can be obtained by changing either pulley.

The buffer has two motors in



the base. The spindles are made of nickel-steel. The S.K.F. ball bearings are mounted in dust-proof chambers. All bearings run in oil. Each spindle is fitted with a hand brake and a shaft lock. The motors are of the ball-bearing type. Each has an independent push-button control.

— 309 —

### Lathe, Polishing and Buffing

*Hammond Machinery Builders, Inc., Kalamazoo, Mich.* [Vol.71,p.340]

Marketed under the trade name of "Rite Speed," this electric polishing and buffing

lathe employing a V-type belt drive is furnished in the style shown and also with an overhanging spindle. The motor is located in a pedestal base. Adjustment for taking up slack in the V-belts is made without disturbing the motor mounting. Timken tapered roller bearings or ball bearings may be furnished. An automatic motor starter with overload protection is standard equipment. The combination switch and brake is a feature. Removal of the belt may be accomplished by taking out the four large capscrews.

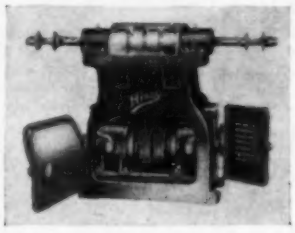
— 310 —

### Buffer, Dual-Motor, "Texdrive"

*Hisey-Wolf Machine Co., Cincinnati, Ohio.* [Vol.71,p.341]

Two separate spindles, each operated by its own motor, are employed in the "Texdrive" buffer. Each motor can be started or stopped at will. This makes it possible to have two spindles operating at different speeds at the same time. The machine is of the gooseneck design. Accessibility of all parts and rigidity of construction are incorporated.

The spindle and bearing housings are assembled as a unit, which may be quickly removed



from the base. The motor is mounted on a cast-iron sub-base securely bolted to the main frame. Changing the belt is a simple operation.

Automatic lubrication is incorporated. The spindle is made of nickel steel, balanced to prevent vibration.

— 311 —

### Buffer and Polisher "Multi-Speed"

*United States Electrical Tool Co., Cincinnati, Ohio.* [Vol.71, p.491]

This four-speed buffer and polisher is driven by 1, 2, 3, or 5-hp. a.c. motors of 220, 440, or 550 volts, 2 or 3 phases, and 25, 40, 50, or 60 cycles. The spindle is mounted on ball bearings and carries four Micarta disks

of what is known as the Gibbs transmission. The speed ranges are from 2,000 to 3,000 r.p.m., and can be easily and quickly made. Other speeds can be provided. Control is by push-button, with overload protection and no-voltage release.

— 312 —

### Polishing Lathe, Double-Spindle, No. 3-DA

*Gardner Machine Co., Beloit, Wis.* [Vol.71,p.795]

"Speed - U - Need" polishing lathe, the No. 3-DA, has been developed. This unit is built with two single-end wheel spindles driven by multiple V-belts from double shaft extensions on the motor in the base. Both multiple sheaves run loose on the motor shafts and are engaged by means of friction clutches operated by handles at the top of the machine. If it is desired to operate the two spindle ends at different speeds, it can be accomplished easily by equipping the motor shaft with sheaves of different diameters.

A magnetic-type starter is used, with a push-button station mounted in the recess on the front of the base. The motor furnished regularly with this lathe is of the inclosed fan-cooled, ball-bearing type, with means for belt adjustment.

Principal dimensions are as

follows: Distance from the end of bearing cap to end of spindle, 13½ in.; distance between faces of inner flanges (standard), 5⅛ in.; diameter of wheel flanges, 4½ in.; total length over spindles, 62½ in.; maximum thickness of polishing wheel, 3½ in.; spindle tapped for taper points, 7/8 in.; 16 threads per in.; height to center of spindle, 39 in.; area of base, 30x25 in.; net weight with 5-hp. motor, 1,225 pounds.

— 313 —

### Polishing and Buffing Lathe, Heavy-Duty

*Hammond Machinery Builders' Inc., Kalamazoo, Mich.* [Vol.71,p.907]

Available in sizes from 3 to 15 hp. inclusive, this heavy-duty, four-bearing, electrically-driven, polishing and buffing lathe has been placed on the market. The motor supplied is especially designed for grinding service. It

is totally inclosed. Clean air is supplied to the motor through an "Air-Clean" filter. Push-button control is conveniently mounted on the front of the pedestal, with a Cutler-Hammer automatic motor starter mounted on the door.

The polishing and buffing lathe is supplied for 220- 440- and 550-volt, 25-, 50-, and 60-cycle two- and three-phase a.c. circuits. Direct current models are also available. The machines are furnished in 3-, 5-, 7½-, 10- and 15-hp. sizes in the four-bearing model, whereas the two-bearing machine is supplied in 1½-, 2-, 3- and 5-hp. sizes.

— 314 —

### Polishing Lathe, Motor-Driven, No. 17

*Frederic B. Stevens, Inc., Larned & Third Sts., Detroit, Mich.* [Vol.71,p.950]

Herringbone-gear drive is featured in the selective-speed, motor-driven polishing lathe announced by the Mitchell Engineering Co., Springfield, Ohio,

and distributed exclusively by the above company. These herringbone gears are capable of transmitting 25 hp., although the machines are available in sizes only to 10 horsepower.

Each spindle-bearing assembly is mounted as an independent unit, and is readily removable from the motor without disturbing the motor or motor bearings. Another feature is that the driving gears are keyed to the motor shaft by means of a feather key which permits the rotor to float to its magnetic center. The gears are completely incased and run in oil.

It is possible with this spindle construction to have one spindle operating at one speed and another spindle operating at a different speed. Spindle speeds obtainable are 1,800, 1,930, 2,070, 2,230, 2,400, 2,580, 2,780, and 3,000 r.p.m.

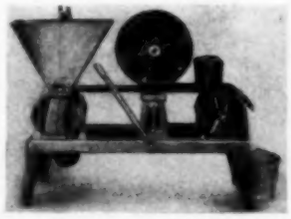
Specifications: Length of spindles over all, 56 in.; diameter of spindles in bearings, 2 in.; distance between wheels, 45 in.; height from floor to center of spindle, 39 in.; size of base, 22x20 in.; net weight, 700 pounds.

—315 —

### Resurfacing Machine, Polishing-Wheel

*D. & H. Scovil, Inc., Higganum, Conn.* [Vol.71,p.682]

For re-coating the faces of polishing wheels with flat surfaces of abrasive grain, this machine has been developed. The machine is mounted on a cast-iron bed. The electrically



heated hopper is provided with valves to shut off the abrasive, and it discharges upon an 8-in. steel belt, which may be adjusted for tension at the opposite end. The wheel mounting is controlled by a lifting jack from a lever at the front to lift the wheel clear from the conveyor belt. A reduction drive is employed between the motor and the belt drive.

## *Transmission Equipment*

— 316 —

### Speed Reducer, Worm Gear, Type HGX

*Foote Bros. Gear & Machine Co., 315 N. Curtis St., Chicago, Ill.* [Vol.71,p.299]

Constituting an addition to the "Hygrade" line, this Type HGX worm-gear speed reducer is an intermediate step between the Type HGS single-reduction and the Type HGD double-reduction units. The Type HGX provides higher reduction ratios than standard for the Type HGS, but still has the right-angle drive. The reducer consists of a standard "Hygrade" single-reduction worm reducer and a set of helical gears mounted on the worm shaft and inclosed in a suitable housing. The

maximum motor speed allowable is 4,000 r.p.m. The unit is fully inclosed and self-lubricated and is provided with anti-friction bearings.

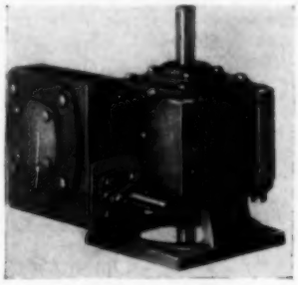
The helical gears have a maximum ratio of four to one, thereby increasing HGS unit ratios by 4 times.

— 317 —

### Speed Reducers, Double-Reduction

*Ohio Gear Co., 1333 East 179th St., Cleveland, Ohio.* [Vol. 71,p.567]

This line of double-reduction speed reducers to supplement the single-reduction units is equipped throughout with Timken roller bearings, hardened



and ground worms, and bronze worm wheels. The illustration shows a reducer case with high-speed shaft horizontal and low-speed shaft perpendicular. The case is also made with both shafts horizontal.

The speed reducers are available in standard ratios of from 100 to 1 to 24,000 to 1 and torque capacities varying from 100 in.-lb. to 3,200 inch-pounds.

— 318 —

### Transmissions, Multi-Speed

*Wise Manufacturing Co., Berkeley, Calif.* [Vol.71,p.379]

This multi-speed transmission for machine-tool drives, which can be reversed electrically, will give any speed without stopping

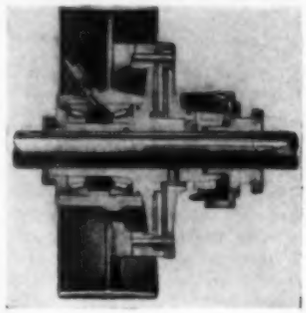
the motion. The device can be mounted in any position on a machine tool or any machine the same as an ordinary electric motor. The transmission is built to replace the end bracket of any electric motor, and delivers four speeds in geometric ratio to the pulley. Special speeds can also be furnished from 25 per cent above motor speed down to as low as 280 r.p.m. Sizes are from ½ to 10 horsepower.

— 319 —

### Clutch, Disk, Type S F

*Edgemont Machine Co., 2200 Home Ave., Dayton, Ohio.* [Vol.71,p.457]

Intended for both countershaft and machine applications, the Type SF disk clutch in a complete line with pulleys is manufactured. Features are oil sleeve bearings, a choice of Timken tapered roller bearings or Fafnir transmission ball bearings, extended sleeves for mounting



pulleys, sheaves, and gears, and cut-off couplings for connecting and controlling two shafts. Special pulley, sprocket, sheave, and gear-blank applications are made to order.

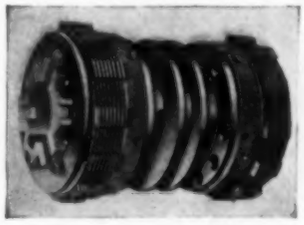
The device is furnished with renewable asbestos metallic liners of large friction area and means for effecting a quick release without dragging. The clutch may be operated at high speed.

— 320 —

### Clutch, Multiple-Disk, Type C.C.

*Twin Disc Clutch Co., Racine, Wis.* [Vol.71,p.487]

This clutch is designed to run in an oil-spray or bath. It is made in sizes from 3½-in. effective diameter of friction disks up to 6-in., varying by half



inches, and also in 7, 8, 9, 10, and 12 in. effective diameters.

In the smaller sizes, all parts are machined from the bar, except the driving plates which are of hard-rolled phosphor-bronze. All steel frictional surfaces are hardened and ground. Centrifugal force operates to release the pressure levers housed in the hub itself. When installed, there are no projecting parts. The clutch is suitable for duplex operation.

— 321 —

### Coupling, Flexible

*American Flexible Co., Erie, Pa.* [Vol.71,p.445]

This shaft coupling is a variation of the Oldham type. The floating center member is a square, hollow casting, with a hole in the center to provide clearance for the shaft ends. To the edges of this floating

member are fastened replaceable non-metallic bearing strips. The flange sections are identical. A wide groove is machined in the face of the flange in which the floating member slides.

The coupling can be taken apart without the use of special tools and the non-metallic bearing strips replaced in a few minutes. The floating hollow center member is filled with grease which passes to the surfaces of the wearing strips through suitable channels fitted with wicks.

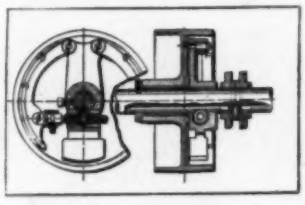
The coupling is available in bores from ¾ to 12 in. and in light- and heavy-duty types. The horsepower transmitted ranges from 0.50 to 1,000 hp. at 100 r.p.m. Both nickel cast-iron and steel couplings are available. The weights range from 6 to 3,200 pounds.

— 322 —

### Countershaft, Friction-Driven,

*Duro-Friction Clutch Co., Grand Rapids, Mich.* [Vol.71, p.456]

The friction-driven countershaft illustrated is simple in design and all parts are of standard construction. A feature is the means for expanding the friction shoes, which have self-equalizing action. Expan-



sion units are made up of right- and left-hand special studs, engaged in the hub of the spur gear. As the rack is moved either to the right or to the left, the spur gear revolves and forces the threaded members out.

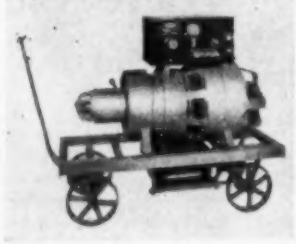
## *Welding Equipment*

— 323 —

### Welder, "Stable-Arc," Improved

*Lincoln Electric Co., Cleveland, Ohio.* [Vol.71,p.35]

Several features of design and construction, including unification of the motor and generator controls, are incorporated in this line. Working mechanism



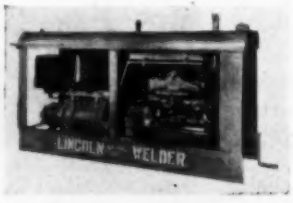
of all controls is contained in a ventilated steel cabinet, with hand regulators and switches mounted on one side. The control panel contains a rheostat regulator, diverter switch, safety-starter switch, volt-ammeter, and wing-nut terminals for cables.

— 324 —

### Welder, Gas-Engine Driven

*Lincoln Electric Co., Cleveland, Ohio.* [Vol.71,p.380]

This gas-engine driven welder, for use where electric power is not available, is of 200 amp.




N.E.M.A. rating, and is powered by a 4-cylinder Waukesha engine, operating at 1,500 r.p.m. An automatic idling device is incorporated. A welded steel canopy totally incloses the outfit.

— 325 —

### Welding Outfit "Weldomatic"

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.71,p.417]

The "Weldomatic" an improved automatic welding outfit, complete with electrode-feeding device, control cabinet, and opera-

tor's panel is designed to operate either variable-voltage or constant-voltage welding motor-generator sets. It automatically strikes and holds an arc between an electrode and the work to be welded. The feeding device is of compact design.

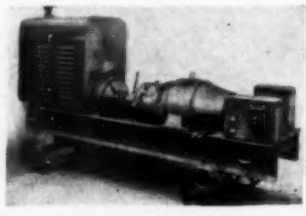
Control units are mounted in a cabinet. A small motor-generator set automatically controls the head motor to change its speed and the direction of electrode feed as required by arc conditions. A switch on the panel also permits the operator to reverse the direction of the head motor to retract the electrode from the work under power.

— 326 —

### Welding Unit, Dual Drive

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.71,p.872]

Another dual-drive arc-welding unit has been introduced. The unit consists of a standard 300-amp., single-operator, weld-



ing generator, a 15-hp., a.c., induction motor, and a six-cylinder, 1,800 r.p.m., Model P-45, Continental, gas engine, all mounted in tandem on a structural steel welded base. The motor operates on 220 volts, but, by reconnecting the external motor leads and changing the Linestarter coil, it can be used on 440 volts.

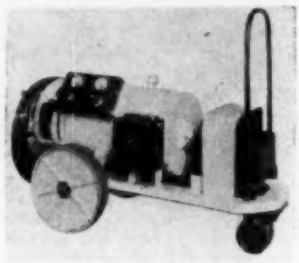
The welding generator can be driven by either the gasoline engine or the electric motor by engaging or disengaging a slip coupling or clutch, whichever is provided. The dual drive welding machine can be furnished in all the standard single-operator ratings.

— 327 —

### Welding Generator, Arc, "Carbo-O Flux"

*Fusion Welding Corporation, 103d St. & Torrence Ave., Chicago, Ill.* [Vol.71,p.1060]

To supply current for welding mild steels, aluminum, copper, and alloy steels by the "Carb-O-Flux" arc welding process, the generator illustrated has been developed. On the heavier sections, it is claimed that this process will cut down the welding time to about one-third, while on the lighter materials the welding time can be cut in two. In addition, the welding cost can be cut from 25 to 75 per cent, depending upon the



job. Strong ductile welds can be made in sheet aluminum, the joint efficiencies being approximately 100 per cent.

The generator is available for a.c., three-phase, 60-cycle, 220- or 440-volt circuits, but can be furnished for belt drive, d.c. operation, and a.c. operation at 25 and 50 cycles on two-phase circuits. Direct gas-engine drive can also be had. All except the first are special. The accessories consist of a cable with proper lugs for attaching an electrode holder, a ground clamp, and a helmet.

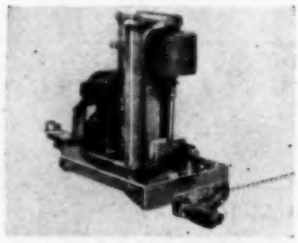
— 328 —

### Welding Generator Control, Idling Device

*Lincoln Electric Co., Coit Rd. & Kirby Ave., Cleveland, Ohio.* [Vol.71,p.1063]

An automatic idling device or throttle control for regulating the speed of the engine in "Stable Arc" welders of the gasoline-engine-driven type has cently been developed. This device increases the speed of the engine automatically from the normal idling speed to the proper speed for welding service whenever the arc is struck. When welding is discontinued, the device automatically reduces the engine to the idling speed.

The operating mechanism of the device consists principally of



a small metal bellows and an electric magnet. The idling device is provided with a control lever that may be set for automatic throttle control, for continuous idling speed, or for governed speed.

— 329 —

### Welding Rod, "Hascrome"

*Haynes Stellite Co., Kokomo, Ind.,* [Vol.71,p.219]

This self-hardening, chromium-manganese-iron alloy, is available in ¼ in. rods, 36 in. long, in bundles of 50 lb. and

in lots of 1,000 lb. It is intended for the hard facing of wearing parts, and is used chiefly for building up badly worn parts preparatory to surfacing with "Stellite." It is also used to some extent for attaching "Haystellite" to oil-well drilling tools.

Hascrome may be applied by the oxy-acetylene process on steel and on cast iron. With the metallic-arc process, a current of 200 to 250 amp. is most suitable. The deposit has a tensile strength of 40,000 lb. per sq.in. and can be forged but not machined.

— 330 —

### Welding Electrode, "New Kathode"

*Lincoln Electric Co., Coit Rd. & Kirby Ave., Cleveland, Ohio.* [Vol.71,p.222]

For arc welding of mild steel and for repair work on cast iron, a welding electrode known as the "New Kathode" will flow easily, with freedom from sputtering, and produce a clean weld with minimum slag and oxidation. It is permissible to use high heat. The resulting weld is soft and readily machineable. The electrode is manufactured in stock lengths of 14 and 24 in. It is packed in a metal container holding 50 pounds.

— 331 —

### Welding Rod for Dies, No. 76

*Una Welding & Bonding Co., Cleveland, Ohio.* [Vol.71,p.563]

This welding rod is particularly adapted for high-carbon tool steels for die work. The rod makes a weld of fire-hardened metal with minimum porosity and with a scleroscope hardness of 60 to 70 which can be further hardened by heat-treatment if desired. A heavy coating provides for alloying in the oxidizing element and concentrates the arc.

The rod is available in the standard sizes varying from $\frac{1}{8}$ to $\frac{1}{4}$ in. in diameter and about 14 in. in length. The unit package is 10 lb. in weight.

— 332 —

### Welding Rod, High-Tensile, No. 65

*Una Welding & Bonding Co., Cleveland, Ohio.* [Vol.71,p.568]

For flat, vertical, and overhead manual welding and flat automatic welding, a high-tensile welding rod is available in unit packages of 25 lb. in standard sizes varying from $\frac{1}{8}$ to $\frac{1}{4}$ in. in diameter, and in 14-in. lengths, and also in rolls for automatic arc-welding. The rod is used for welding requiring high tensile strength and may also be used for building up wearing surfaces requiring machinability. A tensile strength of approximately 60,000 lb. per sq.in. is claimed for the rod. The rod is coated, and is designed to permit stripping at any point and establishing an arc instantly.

— 333 —

### Electrode, "Yellow Jacket," No. 18

*Fusion Welding Corporation, 103rd St., & Torrence Ave., Chicago, Ill.* [Vol.71,p.570]

This welding rod for electric arc-welding, which will weld $\frac{3}{8}$-in. unbeveled plates clear through with one passage of the electrode from one side, is especially manufactured for making heavy, mild-steel arc welds, and for that reason it is particularly adapted to plate welding in boilers, pipes, and tanks. This rod is used in welding plates which are merely butted together, not beveled as in ordinary practice, and welding is done in one passage of the rod from one side of the piece.

— 334 —

### Welding Rod, Bronze, High-Strength, No. 21

*Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y.* [Vol.71,p.571]

This high-strength bronze welding rod with a low melting point may be used for bronze welding steel, bronze, brass, cast iron, malleable iron, wrought iron, copper, nickel, Monel metal, and similar metals. The material can also be used for building up wearing surfaces and for fusion welding of bronze, brass, and other copper alloys. The manufacturer claims for this rod a weld metal which gives a weld equal to and in many cases superior to the original metal from the standpoint of soundness, strength, and ductility. It melts rapidly, coats evenly, flows smoothly, and solidifies quickly. The rod is obtainable in the standard sizes and in standard-weight bundles.

— 335 —

### Welding Rod, Packaged

*Reid-Avery Co., Inc., 21st St. & Washington Ave., Philadelphia, Pa.* [Vol.71,p.605]

Welding rod manufactured by this company is now being offered in an improved 50-lb. package designed for convenience, cleanliness, and for proper handling of the rods in storage and use. A pressed-steel cup is fitted snugly over each end of the standard bundle of welding wire. Three wires of the same analysis as the wire in the package are welded to the edges of each cup, holding the cup in place and giving the package strength and lightness. The package is then rolled in several plies of heavy paper cemented at the ends to the steel cups.

— 336 —

### Welding Rod, Type T, "Weldite"

*Fusion Welding Corporation, 103rd St. and Torrence Ave., Chicago, Ill.* [Vol.71,p.679]

An alloy welding rod for applying a highly wear-resistant surface by either the oxyacetylene or metallic-arc welding process, is being manufactured. It is used to apply a hard surface on tools used for cutting metals, drilling rock, and for similar uses. It may also be used for putting cutting edges on lathes, shaper, and planer tools. The deposited metal has a Brinell hardness of 600.

— 337 —

### Welding Rod, Type S, "Weldite"

*Fusion Welding Corporation, 103rd St. & Torrence Ave., Chicago, Ill.* [Vol.71,p.909]

For welding chrome and chrome-nickel alloy steels, the Type S welding rod has been developed. It is designed primarily for welding the air-quenching austenitic chrome-nickel alloy steeels by either the metallic arc, "Carb-O-Flux," or oxyacetylene processes. The metal is an alloy steel containing approximately 18 per cent chromium, 8 per cent nickel, and is quite low in carbon. It is available as a special flux coated metallic arc electrode for welding No. 14 gage and heavier and as a Carb-O-Flux welding rod for No. 14 gage and lighter material. It is also available as a bare welding rod for oxyacetylene welding of No. 16 gage and heavier.

Physical properties of the type S metal are, when severely cold worked, ultimate tensile strength, 157,000 lb. per sq.in., yield point of 153,000 lb. per sq.in., elongation in 2 in. of 18 per cent and Brinell hardness of 250; when annealed, it has an ultimate strength of 82,000 lb. per sq.in., yield point, 38,000 lb. per sq.in., elongation in 2 in. of 67 per cent and Brinell hardness of 135.

— 338 —

### Burner, Kerosene, Type 8-K

*St. Paul Welding & Manufacturing Co., 174 W. Third St., St. Paul, Minn.* [Vol.71,p.1023]

For preheating heavy pieces of iron and steel before welding, the "Torit" Type 8-K kerosene burner has been placed on the

market. The burner is a portable hand pump outfit, which throws a flame about 2 ft. long. The tank is of 10-gal. capacity and is equipped with a double-acting pump allowing for suction of either air or kerosene. Thus, the tank can be refilled while the torch continues to operate.

— 339 —

### Generator, Acetylene, Portable

*Alexander Milburn Co., Baltimore, Md.* [Vol.71,p.381]

A portable acetylene generator has been placed on the market. The generator body is made of drawn seamless steel and has passed laboratory tests of the Underwriters Laboratories, Inc.

Uniform carbide feed and complete combustion of the charge are claimed.

Simplicity is the keynote. Few moving parts are required. The carbide-hopper feed control and the head are assembled in one unit. The machine is equipped with blow-off valves, pressure control, safety gas purifier, and strainer. Handles are provided for convenient transportation. The generator is made in three sizes, 35, 70, and 100 lb. per sq.in. capacity.

— 340 —

### Holders, Welding-Electrode

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.186]

This clamp-type electrode holder having heavy copper-alloy jaws notched to hold firmly any size of electrode

wire from $\frac{1}{16}$ to $\frac{1}{4}$ in. in diam. in any position, is designed for use with currents up to 300 amp. The operator is protected from heat and from contact with current-carrying parts by a molded-compound handle.

— 341 —

### Trucks, Generator, Acetylene, Types CLP-2 and CLP-3

*Oxweld Acetylene Co., 30 E. 42nd St., New York, N. Y.* [Vol.71,p.220]

These trucks to accommodate the Type CLP-3 and the Type CLP-2 "Carbic" acetylene generators, will hold cylinders of oxygen in addition to the generator. The smaller truck runs on two 24-in. steel wheels and one 5-in. caster. The larger

truck has two 24-in. steel wheels, with 3-in. tires and a caster, 12 in. in diam. by 2 in. wide. This arrangement allows the truck to be turned in a radius about equal to its own length.

The generator is secured to the steel deck of the truck by means of angle-iron braces and two long bolts. The oxygen cylinders are chained to a steel rack fastened to the deck of the truck. A crane is provided to be used in charging and emptying the generator. The crane jib is made in three sections that can be telescoped when not in use. The truck is provided with a steel toolbox with loop fastenings.

— 342 —

### Pressure Meter, Welding-Electrode

*Gibb Welding Machine Co., Bay City, Mich.* [Vol.71,p.868]

For indicating the pressure obtained at the electrodes of welding machines, a pressure meter has been announced. This pressure meter operates by hydraulic pressure, the oil reservoir being formed by seam welding the edges of two stamped disks.

To determine a certain welding pressure, the oil-filled disk portion of the meter is placed between the electrodes of the welding machine and the pressure applied is registered in pounds by the indicating part. The outstanding advantage of the meter is the fact that welding machines can be set to the exact pressure desired. Also,

the pressure meter facilitates the recording of the correct pressure for certain welding jobs.

The pressure meter is small and compact, having a highly polished chrome-plated surface. Weight, 2 pounds.

— 343 —

### Regulator, Two-Stage, Type R-109, "Prest-O-Weld"

*Oxweld Acetylene Co., 30 E. 42nd St., New York.* [Vol.71, p.757]

A two-stage oxygen regulator designed to minimize fluctuation in working oxygen pressures designated as the type R-109, incorporates the stem-type valves that have proven satisfactory in single-stage regulators.

Instead of reducing the full

cylinder pressure down to working pressure in one-stage, the R-109 regulator reduces through this range in two stages. In the first stage, the cylinder pressure is reduced to about 175 lb. per sq.in. then the oxygen passes to a second assembly, where the pressure is reduced to that desired by the operator, the second-stage reducing valve being adjustable.

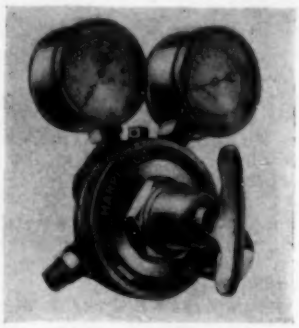
The type R-109 regulator will operate with equal efficiency whether the oxygen cylinder is full or nearly empty, and the working pressure will remain constant. It supersedes the type R-105. It is provided with 3,000-lb. and 100-lb. gages, and is equipped with a $\frac{1}{4}$-in. ferrule hose connection.

— 344 —

### Regulator, Gas Cylinder, Multi-Stage

*Harris Calorific Co., Cleveland, Ohio.* [Vol.71,p.759]

Through the use of multi-stage reduction of the gas pressure in the cylinder to the pressure at the welding torch, the "Multi-Stage" regulator gives uniform pressure at the welding tip. The pressure reduction is accomplished in two stages. The first stage takes a long drop from the cylinder pressure down to a constant sub-pressure from whence the gas is passed to a



second stage and then to the torch.

All parts of the regulator are accessible, and forged material is used throughout. With the adjusting screw set at the working pressure, the full cylinder pressure may be turned on.

## *Woodworking Equipment*

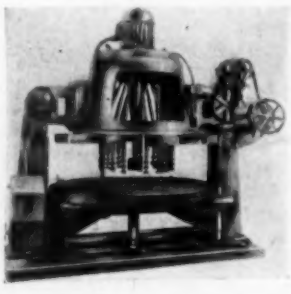
— 345 —

### Boring Machine, Wood, Reel, Style "AMR"

*B. M. Root Co., Sherman St., near Prospect St., York, Pa.* [Vol.71,p.1023]

The Style "AMR," direct-motor-driven, vertical, universal, multiple-spindle reel borer is designed to bore all the holes in a wire cable reel in one operation. The machine can also be used for other classes of boring. Slide ways for the table movement are planed and scraped and counter-weights for the table are housed in one column.

The table drops by gravity when released by the knockout rod. Its downward movement is controlled by two friction brakes and a pneumatic air plunger. A foot trip mounted on the base controls the feed. Spindles are of the adjustable universal joint type, except the center spindle, which is fixed.



The spindle joints are $1\frac{3}{4}$ in. in diameter. Each adjustable spindle may be adjusted 6 in. in all directions from its vertical straight position.

The vertical motor driving the spindles is of 15 hp., 900 r.p.m., and the feed motor is of 5 hp., 1,200 r.p.m. Both motors are of the ball bearing type. Control is of the automatic resistance type with a push-button master control.

Specifications: Holes bored, minimum, 5 in., maximum, 40 in. in diameter; largest diameter cable reel accommodated, 72 in.; spindle speed, 1,800 r.p.m.; center spindle speed, 900 r.p.m.; distance from spindle noses to table in lowest position, 16 in.; distance from spindle noses to floor, $44\frac{1}{2}$ in.; size of base, 40x110 in.; floor space, 5 ft. 2 in. wide by 10 ft. 4 in. long; weight, 8,000 pounds.

— 346 —

### Boring Machine, Wood, Style "GM"

*B. M. Root Co., Sherman St., near Prospect St., York, Pa.* [Vol.71,p.1027]

Three types of feed are available in the style "GM" motor-driven wood-boring machine. These feeds include automatic power feed combined with foot feed, foot-and-hand booster

lever feed, and foot feed only.

Two rates of feed are furnished regularly on the first type, 17 and 23 strokes per min. Other rates can be furnished. The foot feed also supplied with this type of machine is used for setting up or boring stock that is difficult to handle.

The table can be tilted to the right or the left for boring holes at an angle, and can be locked in position. The maximum distance between spindle nose and table is 22½ inches.

The motor of the boring unit is designed especially for woodworking service, and is usually furnished in the 1-hp. size for speeds of either 1,800 or 3,600 r.p.m. A two-speed motor to operate at 1,800 and 3,600 r.p.m. can be furnished if desired.

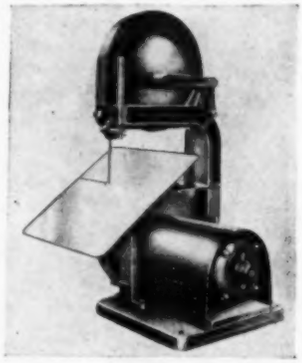
Specifications: Distance from center of spindle to column, 11 in.; maximum stroke of motorized spindle, 6 in.; distance through which table may be adjusted, 15 in.; size of table top, 12x24 in.; height, 5 ft. 6 in.; floor space, 2 ft. x 2 ft. 6 in.; shipping weight, power-feed machine, 850 pounds.

## — 347 —

### Sawing Machine, Improved "Safety"

*Horn Device Manufacturing Co., Kenmore Box 784, Akron, Ohio.* [Vol.71,p.682]

An improved safety bandsaw is being marketed. Features of the saw are a spring control tension element, Timken bearing equipment, and a spur gear and pinion drive. The entire vertical movement of the top wheel is controlled by a spring. The



bottom wheel bearing of the saw is constructed of two Timken taper roller bearings. Steel disk wheels are utilized for the running wheels for the saw blade. Guards cover the upper wheel, the lower wheel, the motor, and the saw.

The table of the machine is 18 in. square. The machine has a 13¾-in. throat, and a clearance of 5½ in. is allowed under the guide for wood. The maximum soft steel which can be sawed is ½ in. in thickness, and brass of 1 in. in thickness can also be sawed. All guards are easily removed, and a light is included directly above the work. A ½-hp. motor, which can be operated from a 110-volt a.c. light socket, or a 220-volt power circuit, is provided.

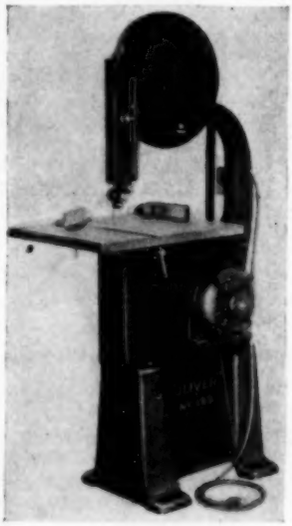
Weight, 200 pounds.

## — 348 —

### Sawing Machine, Band, No. 192

*Oliver Machinery Co., Grand Rapids, Mich.* [Vol.71,p.382]

This portable, lamp-socket band saw has a capacity of 18 in. between saw and column, a height of 8 in. between the table and upper guard, and can use saws up to ½ in. wide. The table is of cast iron, 24 in. wide



by 20 in. long, carries a ripping fence and a miter cross-cut gage, tilts 45 deg., and is 38 in. off the floor. The 8-in. wheels are made of cast iron and have a 1¼-in. base, are rubber covered, run in ball bearings, and are guarded. The upper wheel has a 4-in. vertical adjustment. Drive is either direct motor-on-shaft or belt. Motor fully enclosed, ½ hp., 900 r.p.m. Floor space, 22x34 inches.

## — 349 —

### Saw, Improved, Model D, "Wonder Worker"

*DeWalt Products Corporation, Leola, Pa.* [Vol.71,p.225]

Improvements in the Model D woodworking saw make possible the delivery of fully 50 per cent more power. The machine performs 29 operations. It crosscuts 6-in. material, and can be switched from cross-cutting to

ripping without stopping the motor.

Another improvement introduced is the placing of the dialplate, with degree markings and pitch scale, in front for angle- or bevel-cutting. The dialplate is notched at each 45 deg. The motor is secured in any position by means of a positive lock. The machine is driven by a two- or three-phase, 5-hp. motor.

The saw is portable, weighs 340 lb., and is fitted on a 29x59-in. portable table.

## — 350 —

### Saw, Universal, Double-Arbor, No. 575

*J. A. Fay & Egan Co., Cincinnati, Ohio.* [Vol.71,p.609]

Two saws and two motors operated by a single control are embodied in this No. 575 all-electric, ball-bearing-equipped, double-arbor, universal saw. Either a rip saw or a cross-cut saw, direct-motor-driven, can be had by rotating the revolving motor frame. No belts, countershafts, nor motors project outside. The machine with a 14-in. saw will rip 26 in. between the saw and the fence and through material 3 in. thick, or 4 in. thick with a 16-in. saw.

A motor is built directly on each arbor. The table is made

in two sections, a moving section 44x17 in., mounted on anti-friction rollers, and a stationary section, 44x26 in., having an extension so that material up to 26 in. wide can be ripped. The table can be tilted 45 degrees.

The motors are 5 hp. each for either 2- or 3-phase, 60-cycle, 110-, 220-, 440-, or 550-volt, a.c. circuits. A push-button station and magnetic switch are built in. Both motors are so interlocked that when one is in position and started the other is cut out automatically. Saw mandrels are 1⅞ in. in diameter. Floor space occupied is 48x54 inches.

## — 351 —

### Saw, Portable, Electric, Type K-8, "Speedmatic"

*Porter-Cable Machine Co., Syracuse, N. Y.* [Vol.71,p.482]

The blade is mounted directly on the motor armature, which runs on two precision ball bearings of the unit type, with dust

seal. The device weighs only 12 lb. and can be easily operated with one hand.

Adjustment for depth or angle cutting is made by turning a thumbscrew, each adjustment being independent of the other. There is a 1¼-in. depth-adjustment range. An 8-in. blade cuts from 1 to 2¼ in. in depth, a 6-in. blade from 0 to 1¼ in. Dados recommended are 5 in in diameter and up to ¼ in. wide, with a ¾ in. maximum depth of cut.

The saw blade is fully guarded at all times. The saw is powered by a special universal motor of ¼-hp. rating and the saw blade is driven at 10,000 r.p.m. A switch must be held while the saw is in operation and shuts off automatically when released. The motor-cooling fan is built on to the armature shaft.

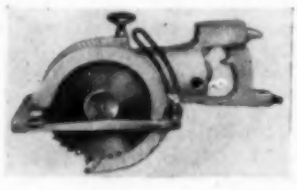
Size over-all, 11¾ in. long, 6½ in. wide, 10¾ in. high, weight, 12 lb. Standard equipment includes: One 8 in. combination saw blade for cross-cutting and ripping; 15 ft. of rubber-covered connector-cable; adjustable ripping gage; wrench, and triangular cross-cutting guide.

## — 352 —

### Handsaw, Electric, Model "K"

*Wodack Electrical Tool Corportation, 4627 W. Huron St., Chicago.* [Vol.71,p.680]

A light-weight, one-hand electric saw is being placed on the market. The saw weighs 15 lb. complete, and is of compact construction, featured by a sawdust blower to aid vision, a convenient trigger switch, a momentary-contact rip gage to save marking the board to be



sawed, and a depth gage adjusted by a wing nut. The unit is furnished complete ready to use. Accessories included are a 15 ft. extension cord, a 1-lb. can of lubricant, a grease gun, a steel carrying case, an adjustable depth gage, and a rip gage. The saw will saw boards up to 2⅜ in. thick. It is also used for crating in industrial shipping departments.

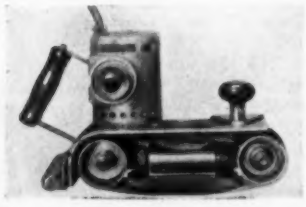
## — 353 —

### Saw, Electric, Heavy-Duty, Model R

*Skilsaw, Inc., 3814 Ravenswood Ave., Chicago, Ill.* [Vol. 71,p.724]

Like the smaller models manufactured by the company, this large Model R heavy-duty "Skilsaw" has an aluminum body, and shafts and gears of chrome nickel steel. It is powered with a universal motor that operates from any light socket. The 12-in. blade gives a maximum cutting depth of 4⅜ in., the base of the saw being adjustable to the depth of cut.

The Model R is provided with an improved swivel foot for beveling with a degree gage and



is fitted with a safety guard. The unit can be changed into a bench or table saw by simply turning it upside down. Besides cutting and ripping heavy lumber, the Skilsaw cuts metal up to 20 gage, copper cable, lead pipe, and, when fitted with a carborundum disk, will also cut stone and composition.

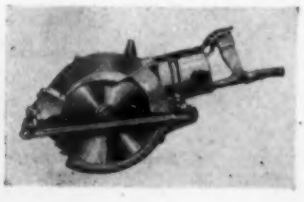
Standard equipment includes one combination rip and cut-off saw blade, an adjustable rip fence attachment, rubber-covered cord with turn-and-lock attachment plug, a high-pressure grease gun and a socket wrench —all contained in a handy carrying case with the saw itself.

## — 354 —

### Shaper, Electric, "Workace"

*J. D. Wallace & Co., 134 S. California Ave., Chicago, Ill.* [Vol.71,p.225]

Intended for use in small cabinet, pattern, carpenter, and maintenance shops, the "Workace" electric shaper is direct-motor-driven and the armature shaft and shaper spindle are integral. It has a no-load speed of 10,000 r.p.m. and the motor is protected. The table is mounted on a screw and can be locked in any position. The steel spindle is ⅜ in. in diam.,



extends 3⅜ in., and has a capacity of 2½ in. between the two steel shaper collars, or 3¼ in. using solid cutters.

The shaper can be used on the ordinary lighting circuit. It weighs 42 pounds.

## — 355 —

### Sander, Type B-7, "Take-About"

*Porter-Cable Machine Co., Syracuse, N. Y.* [Vol.71,p.913]

High belt speed of 1,800 ft. per min. on this "Take-About" portable sander makes it especially suitable for finishing, grinding and polishing on body and metal work. As the belt moves in a straight line, it leaves no cross scratches and secures a high degree of finish. The machine is also suitable for surfacing wood products.

A 1½-hp., 180-cycle motor is used to drive the belt on the Take-About sander at a maximum motor speed of 10,800

r.p.m. The use of 180-cycle current has permitted a reduction in motor size. The rotor of this motor cannot burn out and has no commutator or brushes.

The belt, 3x25¾ in., travels at 1,800 ft. per min. The diameter of the pulleys employed is 2¾ in. Equipment includes six belts, ½-in. felt-covered shoe, and 20 ft. of rubber-covered, four-conductor cable without plug. Overall dimensions are: Height 9 in.; width 6 in.; length 15 in., and the weight is 21 pounds.

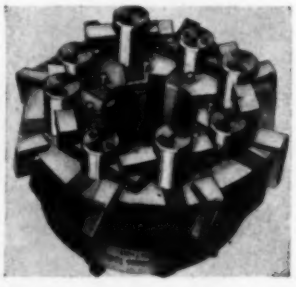
# *Small Tools*

## — 356 —

### Boring Head, Swing-Tool

*Gairing Tool Co., Detroit, Mich.* [Vol.71,p.497]

This tool consists essentially of several toolbits held in round drawbars that fit snugly in the toolhead. The bottom of the toolhead has radial recesses, into which the toolbits fit, and which preserve accuracy of alignment.



The body of the drawbar back of the head is reduced in size, and is centered by two bushings. The extreme back end of the bar is squared, and adjacent to this is a threaded portion with a nut that draws the toolbit down into the recess.

The tools are ground in position. They are held in the head by the hollow setscrews at the large end of the drawbar. When the nut on the end of the drawbar is loosened, a spring under the head lifts the toolbit clear of the radial recess. A wrench may be used on the squared end to turn the tool out of the way. The head is fastened to and driven by a bar having a key.

## — 357 —

### Cutter-Blade Holders

*O. K. Tool Co., Inc., Shelton, Conn.* [Vol.71,p.186]

A line of cutter-blade holders using serrated blades has been developed, it is claimed, to cover all kinds of metal-cutting opera-

tions, including milling and broaching.

The blade has fine serrations upon one side which has a 5-deg. taper that locks it securely in the holder. The tool can be set with so little overhang that the tool block also grips the cutter. Serrations are so placed that the adjustment is in the direction of greatest wear. The blade may be ground to cut a specific hole size, and when worn, it may be set over one serration and ground again.

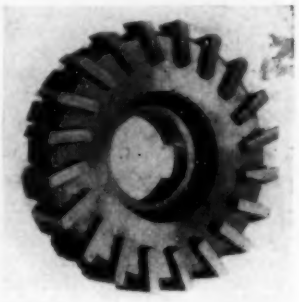
The holders are made in sizes for standard toolposts and turrets, while boring bars range from ¾ to 2½ in. in diam. Cutter blades are sized in proportion.

## — 358 —

### Cutters, Inserted-Blade

*Goddard & Goddard Co., Inc., Detroit, Mich.* [Vol.71,p. 481]

This line includes small facing cutters from 3 to 7 in. in diameter, applicable to the National Standard shell end-mill arbor; right and left-hand spiral facing cutters adaptable to milling-machine spindle noses ranging from 8 to 20 in. in diameter; right and left-hand spiral straddle mills from 4 to 20 in. in diameter; and alternate-



tooth cutters ranging from 4 to 8 in. in diameter and from ½ to 1 in. in width.

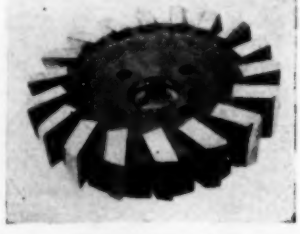
All these cutters are fitted with inserted blades having machined serrations on the backs which mate with corresponding serrations in the back of the body tooth slot. A flat wedge is used in front of the blade.

## — 359 —

### Cutters, Face-Milling, Extra-Heavy-Duty

*O. K. Tool Co., Inc., Shelton, Conn.* [Vol.71,p.531]

For milling large castings and forgings where considerable variations in cuts are encountered, these extra-heavy-duty, face-milling cutters are made in sizes from 8 to 30 in.



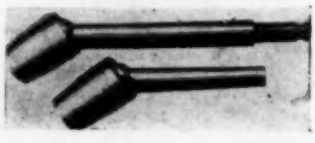
in diameter. The blades used are all ¾ in. thick, but are made in two sizes, 1¼x2 in. and 2x2½ in. The number of blades used varies with the diameter of the cutter.

## — 360 —

### Nut Setters, Universal-Joint

*Apex Machine Co., Dayton, Ohio.* [Vol.71,p.565]

A universal-joint nut setter adapted to setting nuts and cap screws in inaccessible places is being manufactured.



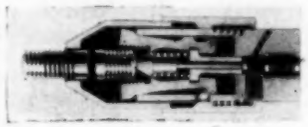
The socket end of the joint is made to fit over the nut and the shank on the ball end is made to specifications as to length, shape, and similar dimensions. The tool is made of special alloy steel and will operate up to 30 deg. The illustration shows both the straight-shank tool for welding to hand braces and the special long-shank tool.

— 361 —

### Stud Setter, Quick-Release

*Titan Tool Co., Erie, Pa.* [Vol.71,p.912]

This self-opening stud setter has been placed on the market. It is a power-driven unit adaptable to drill presses of all types, and air and electric drills, both portable and stationary. It



will work efficiently at either high or low speeds and at any angle. Although positively driven, the studs are released automatically when driven to a predetermined distance, and they are free from burred threads.

Studs as short as ½ in. may be seated successfully with this tool. It is made in two sizes having maximum capacities of ½ and ⅞ in., respectively.

— 362 —

### Drills and Reamers, Tungsten-Carbide-Tipped

*Cleveland Twist Drill Co., Cleveland, Ohio.* [Vol.71,p.493]

The properties of the tungsten-carbide alloys are so different from the steels now used for cutting tools that it has been necessary to develop tools to

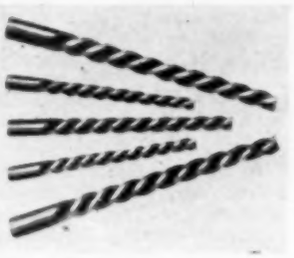
utilize these materials to advantage. This has been done by brazing inserts of the hard metal alloys to a steel body.

— 363 —

### Reamers, Diemakers, No. 678

*Morse Twist Drill & Machine Co., New Bedford, Mass.* [Vol.71,p.680]

This taper die reamer is designed especially for diemaker's use. The taper on the reamer is ¾-deg. included angle, ap-



proximately 0.013 in. per inch. In laying out a die, holes can be drilled close together, outlining the shape desired, and then reamed with this tool until the holes run together. The reamer can then be run along the outline of the die as a spiral mill.

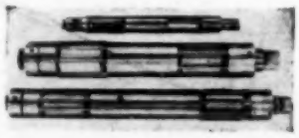
Rapid action of the reamer and its freedom from chip clogging are two features. Another is its freedom from breakage. Large sizes of these reamers can often be used for profiling. They are made in sizes from AAA to U and vary in diameter at the small end from 0.058 to 0.443 in. and at the large diameter from 0.073 to 0.518 inch.

— 364 —

### Reamers, for Railroad Motion Work

*Foster Johnson Reamer Company, Elkhart, Ind.* [Vol.71,p.719]

Three tools for railroad motion work have been designed to ream the bronze bushings in valve cross heads, and Walschaert and Baker valve gear



frames. Each tool is double-bladed and the expansion or contraction of both sets of blades is controlled by one graduated adjusting nut. This feature makes it possible to ream two holes in line in one operation.

— 365 —

### Reamer and Arbor, Expanding

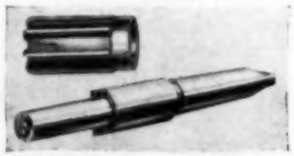
*Conradson Tool Co., 2101 Indiana Avenue, Chicago, Ill.* [Vol.71,p.1019]

A line of expanding shell-type reamers together with a line of expanding arbors has been developed. It is possible to use the arbors separately or in conjunction with either the solid or the expanding-type reamers.

The reamer is made of high-speed steel blades cast into a base metal. Six or eight blades are used, depending upon the size of reamer, and the body of the expanding type is slit about one-third the length back, at three or four places. Drive is by two keys in the arbor that engage slots in the base metal. Another feature of the tool is the fact that the blades are extended beyond the body, making it possible to face the bottom of a hole.

These expanding reamers are made in sizes varying from 1 1/16 to 3 in. in steps of 32nds up to 2 in., and by 16ths beyond. The over-all length varies from 2⅞ to 4 inches.

Six different sizes of arbors are available, corresponding to



the range of inside bores of the reamers. Each arbor is made of SAE 1315X steel, with the sleeve carrying the driving keys. One end has a Morse taper, varying from No. 2 to No. 5; the other end is slit and has a taper socket and screw for expansion.

— 366 —

### Saw, Inserted-Tooth

*Hunter Saw & Machine Co., 57th and Butler Sts., Pittsburgh, Pa.* [Vol.71,p.605]

Developed for high-speed cutting, an inserted-tooth saw has been put on the market. The teeth and pockets of the saw are both serrated, thus locking the teeth firmly in the saw body and preventing movement of the teeth during cutting. Teeth are

adjustable by moving them up or down on the serrations. The teeth are ground in the saw and the only time it is necessary to remove them is for replacement. The saws are manufactured in a variety of thicknesses of plates and kerfs.

— 367 —

### Blades, Saw, for the No. 0 Cut-Off Machine

*Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.* [Vol.71,p.952]

Two saw blades, one for cutting thin tubing and metal moldings and the other for the high-speed cutting of non-ferrous slab, have been placed on the market. The first type has a solid blade with sharp teeth that can be re-sharpened. It is 24½ in. in diameter and ⅛ in. thick. Cutting is done without leaving a burr. The speed when driven direct by the motor is about 3,600 r.p.m. The inserted-tooth saw, the second type, is also 24½ in. in diameter but ¼ in. thick, the kerf being ⅛ in. Motor drive for this saw is by means of an 1,800 r.p.m. motor when directly connected.

— 368 —

### Toolbit, High-Cobalt

*Simonds Saw & Steel Co., 127-129 South Green St., Chicago, Ill.* [Vol.71,p.565]

A high-cobalt toolbit designed for use on lathes, planers, and shapers for high-speed work carries a double diamond marking, each diamond containing within it the conventional Simonds S. The steel can be furnished in hardened bits or in annealed bars and is available in all standard sizes.

— 369 —

### Tools, Tungsten-Carbide-Tipped, Mechanically-Held

*Firth-Sterling Steel Co., McKeesport, Pa.* [Vol.71,p.796]

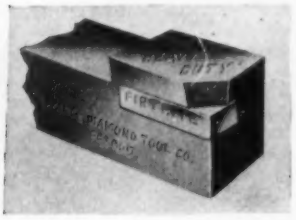
As a result of extensive cutting tests on steel, a new method of holding tungsten-carbide tips in tool shanks has been developed. In this type of tool, a tapered tungsten-carbide blank, somewhat larger than would ordinarily be used for the same size shank, is fitted and keyed into a tapered slot in the shank. This is done in such a manner that a sufficient surface of the blank is exposed and may be ground to the proper angles, and offers sufficient cutting edge necessary for the depth of cut to be taken. The design is such that it is impossible for the tip to come out from any pressure resulting from the cutting. Furthermore, the tool shank acts as a protection from the chip as it curls over and sometimes strikes the side of the tip, causing chipping. A very thin copper sheet or plating is interposed between the contacting surfaces of the tungsten-carbide tip and the tool shank. This acts as a lubricant to permit a slight movement between the tip and the shank. The material used is "Dimondite," now renamed "Firthite."

— 370 —

### Tools, Tungsten-Carbide-Tipped, "Bull Dog"

*Advance Diamond Tool Co., 427 W. Congress St., Detroit, Mich.* [Vol.71,p.951]

Another process of welding a tungsten-carbide tip into a pocket in a tool shank has been developed. When regrind-



ing the tool bit, the top part of the shank is removed only sufficiently to permit grinding and lapping the tungsten-carbide. Therefore, the tungsten-carbide is reinforced until it is entirely used up. It is claimed that this mounting prevents the breakage sometimes experienced under heavy cutting.

## — 371 —

### Cutting Metal, Tungsten-Carbide

*Ludlum Steel Co., Watervliet, N. Y.* [Vol.71,p.492]

Strauss metal, a tungsten-carbide product, is intended for use in cutting tools such as saws, milling cutters, profile cutters, end mills, filing cutters, reamers and on drills used on hard and tough alloys where the runs are long or the cutting difficult. Advantages claimed are that it will speed the machining of many materials, will enable manufacturers to use harder materials or to do cutting jobs hitherto considered impossible, and will solve machining problems presented by abrasives.

## — 372 —

### Cutting Metal, Tungsten-Carbide "Dimondite"

*Firth-Sterling Steel Co., McKeesport, Pa.* [Vol.71,p.683]

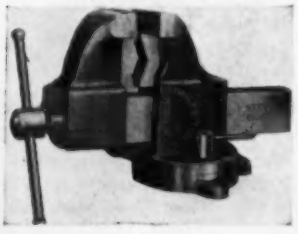
This tungsten-carbide metal, known as "Dimondite," is claimed to approach diamond in hardness and high-speed steel in toughness. Dimondite is obtainable either as a tip on solid-shank tools or as a tip on standard and special toolbits.

## — 373 —

### Vise, Pipe, "Simplex"

*Simplex Tool Co., Woonsocket, R. I.* [Vol.71,p.304]

This combination pipe vise has a steel slide which eliminates the possibility of breakage in the slide just back of the front jaw. The reversible pipe jaws are made of hardened tool steel. Inserts are made of hardened steel held in place by dowels and screws.

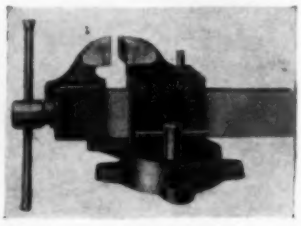


## — 374 —

### Vise, Swivel Backjaw

*Simplex Tool Co., Woonsocket, R. I.* [Vol.71,p.913]

The back part of the vise is made in two parts, the top part of which swivels making it possible to hold irregularly shaped pieces. This top part is provided with a pin which locks it



to the back jaw when the swivel feature is not desired.

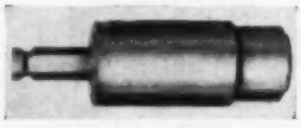
In common with the rest of the vises manufactured by the company, this vise is made with steel slide. That is, the sliding member of the front jaw is machined out of a solid bar of steel, making this part unbreakable. It has a special type nut into which the operating screw is inserted. The nut is so designed that it cannot lift up at the back and bind the screw and thereby limit the gripping power and make both the screw and the nut susceptible to breakage. Other features are the outside screw retainer and removable jaw inserts, which are doweled as well as screwed on.

## — 375 —

### Chuck, Friction, for Electric and Air Tools

*Apex Machine Co., Dayton, Ohio.* [Vol.71,p.870]

This multiple-disk safety friction chuck is furnished with a shank to fit any electric or air tool, and with a hole in the bottom to take any make of socket wrench, screw driver, bit, or other similar tool. When the friction is set to the desired tension, a uniform setting is ob-



tained and the slippage of the friction unit prevents damage to the tool.

Nut setters, also available, are made of special alloy steel. In addition to these, stud setters with alloy-steel sleeves and screwdriver bits are furnished with shanks to fit any make of electric or air tool.

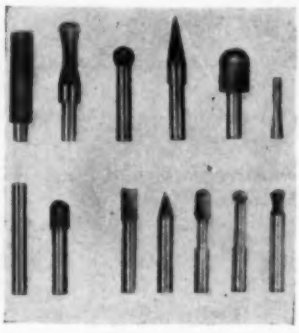
## — 376 —

### Files, Rotary

*Rotary File Co., 14063 Welland Ave., Detroit, Mich.* [Vol.71,p.606]

A complete line of 22 shaped rotary files for flexible-shaft equipment, bearings, die sinking, and metal pattern-making is being introduced. The manufacturer claims for this line of files ability to cut a true outline, to give a smooth surface finish, and to give fast cutting speed. All files of the line have their teeth milled and generated. The teeth are cut on a strong left-hand helix to avoid chattering and hogging-in of the file and to give a smooth surface finish.

All of the files have a ¼-in. diameter shank, are made of special steel and hardened to make them adaptable to filing



operations in connection with flexible shafts, in profiling machines, or in drill presses for burring small parts. All the standard shapes are carried in stock.

## — 377 —

### Hacksaw Tool

*Johnson Tool Co., Room 634, Rogers Bldg., Vancouver, B. C., Canada.* [Vol.71,p.1061]

A frame, which employs as a cutting element the regular hacksaw blade, and which is suitable for cutting in close quar-

ters and through the walls of cylinders, has been placed on the market. The blade is held at one end in a slide fitted with a handle, and has its other end projecting through a head fitted with upper and lower rollers. The head of the frame is held against the work and the slide is moved along the guides to reciprocate the saw in its cut.

## — 378 —

### Hone, "Micromatic"

*Micromatic Hone Corporation, 5057 Woodward Ave., Detroit, Mich.* [Vol.71,p.756]

Hand expansion of the stone carrier is done away with in the "Micromatic" hone. The hone is of the single-cone construction and has one central supporting point for the stone holders. The cone is of an angle (beyond the angle of re-

versibility) which maintains a positive expansion. The stones are mounted in light metal stampings.

To meet the requirements of relatively small production, the model B brake type is supplied. This type uses interchangeable hone bodies of various sizes with one brake head, the stones being interchangeable with the model A tool. The model B has a positive screw expansion with micrometer set and stop. The simple push-button arrangement can be regulated to an expansion of 0.0005 in. It is suitable for either single or multiple operations.

## — 379 —

### Plier, "Kant Slip"

*Kant Slip Plier & Tool Co., 6036 Wentworth Ave., Chicago, Ill.* [Vol.71,p.905]

Round, square, hexagon, and other shaped articles may be held securely in the "Kant Slip" plier. A sliding fulcrum is produced by the back of the lower jaw sliding on and bearing against a fulcrum at the rear

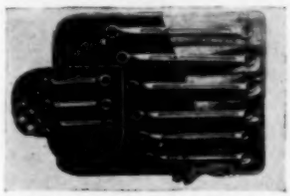
of the upper jaw. Wedging the lower jaw between the fulcrum and a cam-like surface causes pressure to be exerted on the article held. No pressure is exerted on the pin. Since the fulcrum is always close to the load, considerable pressure may be obtained with a moderate grip.

## — 380 —

### Sockets and Wrenches, Double-Hexagon, Chrome-Vanadium

*Bonney Forge & Tool Works, Allentown, Pa.* [Vol.71,p.875]

Chrome-vanadium steel is used for these sockets and short, double-hexagon box wrenches. Because of the great strength



of this alloy, it has been possible to design the sockets with very thin walls. The wrenches are broached with double hexagon openings, making it possible to remove nuts or bolts even though obstructions will permit only a one-twelfth turn at a setting.

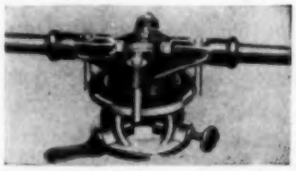
The wrenches are put up in two sets, the No. 29 consisting of three sizes, taking care of the six most commonly used nuts; No. 31 set consisting of six wrenches, also for commonly used nut sizes.

## — 381 —

### Stock, Die, "Leader"

*Oster Manufacturing Co., Cleveland, Ohio.* [Vol.71,p.604]

Universal guides that automatically center the pipe is an improved feature of the "Leader" die . stock, which threads pipe from 1 to 2 in. inclusive. It is claimed that the universal pipe guides, the ratchet



construction, and the floating stud arrangement, together with fully adjustable dies, make it easy to operate and fast in threading operations. The stock is available in two types, the No. 1, a plain tool without the ratchet device feature, and the No. 1A with the ratchet construction. On the ratchet-tool, the ratchet can be set for forward or reverse or locked.

## — 382 —

### Tap Sleeve, Floating

*Apex Machine Co., Dayton, Ohio.* [Vol.71,p.794]

A floating tap sleeve to take hand taps and pipe taps has been placed on the market. The device is made with Morse tapers from 1 to 5 inclusive, for taking hand taps from the No. 6

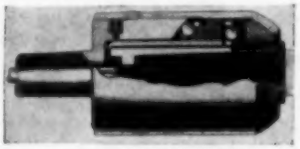
to the 1¼-in. size, and in Morse tapers of 2, 3, 4, and 5 to take ¾- to 1-in. pipe taps. The tap is driven by the square and held in the sleeve the same as in all standard Apex tap collets. The tap is free to float and follow the hole. The sleeve is for use in single and multiple tapping operations, and can be used in any position. It is especially suitable for two- or three-way automatic multiple-tapping machines.

## — 383 —

### Toolholders, Floating

*Apex Machine Co., Dayton, Ohio.* [Vol.71,p.567]

The interior design of the full and semi-floating toolholders is claimed to give them absolutely free flotation. Angular flotation is obtained by the upper rows of ball bearings and parallel flotation by the lower rows. In each set, there are two rows of ball bearings at right angles. The balls operate



in hardened and ground grooves. The semi-floating holder has a parallel float, using only the lower row of ball bearings.

To reduce the overall length of the tool, the inserted-socket type has been added. This type with either Morse taper or straight hole is adaptable to hand screw machines and automatics.

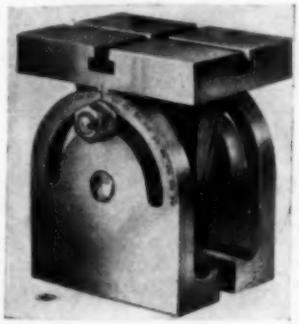
## — 384 —

### Toolmaker's Equipment

*Alliance Tool Co., Alliance, Ohio.* [Vol.71,p.761]

Several items for toolmakers' use have been placed on the market. These include an adjustable angle plate, Style 1920, a Style 1935 drill-press vise, Style 1950 V-blocks, Style 1930 box parallels, and Style 1925 ribbed parallels.

The adjustable angle plate is



made in two table sizes, 4x6 and 8x12 in., the heights being 6⅜ and 9⅜ in. The 8x12-in. size is provided with two slots in the base. The tables are provided with T-slots at right angles.

The drill-press vise is made in three sizes which open to 3½, 4½, and 6½ in. The outstanding feature of the device is a rotating jaw, which has four faces of different shapes. The quick-acting screw makes the operation rapid. One end and the two sides of the vise are machined square. Two sizes of Style 1940 toolmakers' angles are available. These are 2½x3x4 and 2½x6x12 inches.

Style 1950 V-blocks are light and the cored openings provide good means for clamping. They are made in three sizes: 2¾x3½x6½ in., 6x6x6 in., and 8x8x8 in. Ribbed parallels and box parallels are built in numerous sizes. The box parallels are square and accurate, ground all over. The sizes range from 2x2½x3¾ in. to 6x12x12 in. The ribbed parallels are made of malleable iron, ribbed. All sizes are ground to within 0.0005-in. limits. They are available in ten sizes, ranging from ⅜x¾x6 to 1½x3x16 inches.

# *Parts and Mechanisms*

## — 385 —

### Bearings, Ball, Airplane-Type, "S" Series

*Fafnir Bearing Co., New Britain, Conn.* [Vol.71,p.455]

This series of ball bearings is adapted to plane control mechanisms. These bearings, known as the S Series, are of the single-row radial type with

inch dimensions and narrow widths. They are available in bores from ½ to 1 in. as follows:

| Bearing | Bore | Outside Diameter | Width |
|---|---|---|---|
| S 1 | ½ | ⅞ | 7/32 |
| S 3 | ⅜ | ¾ | 9/32 |
| S 5 | ½ | 1⅛ | ¼ |
| S 8 | ½ | 1⅜ | 5/16 |
| S 8 | ⅝ | 1⅜ | 5/16 |
| S 9 | ¾ | 1¾ | ⅜ |
| S 10 | 1 | 2 | ½ |

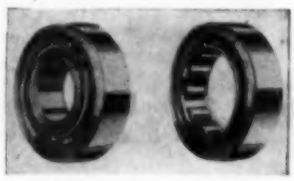
The bearings are made of chrome-molybdenum steel, hardened and ground throughout.

## — 386 —

### Bearings, Roller Radial, Single-Row

*Hyatt Roller Bearing Co., Newark, N. J.* [Vol.71,p.455]

To meet the demand for a roller bearing interchangeable with standard S.A.E. single-row ball bearings, but having greater load capacity, this single-row radial bearing is manufactured. This line, having solid rollers, is not intended to replace the standard Hyatt roller bearing which uses spirally wound rollers, but is offered for positions in which space limitations exist and loads beyond the capacity of ball bearings must be sustained.



The rollers are permanently retained within the outer race, the inner race being separable. A separator, floating on the rollers, spaces them properly, and heat-treated end rings retain them endwise within the outer race. The rollers and races are made of a special chrome-nickel alloy steel, and the end rings are of vanadium steel to minimize wear.

It is claimed that the possible separation of this bearing into two parts, offers opportunities of developing more economical methods of assembling for all applications with or without the inner race. The bearings are made in a range of sizes.

## — 387 —

### Bearings, Ball, Annular, Single-Row

*Hoover Steel Ball Co., Ann Arbor, Mich.* [Vol.71,p.456]

Deep-groove, no-notch construction to withstand heavy thrust and radial loads at high speeds is a feature of the line of single-row annular bearings. Both the raceway and the balls are made of high-carbon, chrome

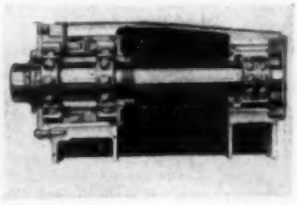
alloy steel. The retainer is made of deep-drawing steel, riveted. The balls are of the "Hoover Micro-Chrome Grade," accurate to within 0.00005 in., and the raceways are ground and polished to a similar finish. The bearings are available in three series, light, medium, and heavy, ranging for the lighter series from 0.3937 in. to 4.7244 in. bore, and for the heavy series from 0.6693 to 3.9370 in. bore.

— 388 —

## Bearings, Ball, Double-Row

*New Departure Manufacturing Co., Bristol, Conn.* [Vol. 71,p.498]

These bearings are of rigid design, particularly adapted to give non-deflecting support under radial and thrust loads. It is possible to mount the bearings



and preload them upon the bench when working on a spindle assembly. These bearings are also applied to tailstock live-centers. They are capable of continuous operation without adjustment or lubrication.

— 389 —

## Bearings, Ball, Self-Lubricated, Single-Row, "N-D-Seal"

*New Departure Manufacturing Co., Bristol, Conn.* [Vol. 71,p.835]

A self-sealed, self-lubricated, ball bearing which reduces mounting costs and at the same time increases bearing efficiency in service life has been announced. The N-D-Seal bearing is made only in the smaller sizes and consists of what is

essentially a single-row ball bearing of the non-loading groove type, permanently fitted into a metal case or shell. This shell is shaped on one side of the bearing to contain a felt closure that fits over the ground outside diameter of the extended bearing inner ring, thus forming an efficient seal both for the retention of the lubricant and the exclusion of foreign matter.

Although the inner ring is carried slightly beyond the face of the seal to facilitate removal of the bearing without damage and to prevent interference between shaft shoulder and seal, the overall width of an N-D-Seal bearing is much less than the space occupied by a standard bearing of the same size together with a separate closure member. Outside diameters and bores are standard.

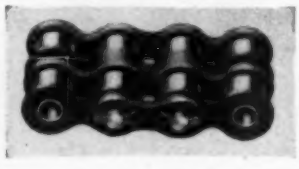
The capacity characteristics of N-D-Seal bearings are substantially the same as those of corresponding sizes of non-loading, groove single-row bearings, which means that they are capable of resisting a comparatively high amount of thrust in combination with radial load.

— 390 —

## Chain, Roller, 2½-Inch Pitch, No. 480

*Diamond Chain & Manufacturing Co., Indianapolis, Ind.* [Vol.71,p.988]

This 2½-in. pitch chain conforms to the A.S.M.E., S.A.E., A.S.M.A., and American standards. It is similar in design to other roller chain manufactured by the company, but is made for heavy-duty applications, such as



large conveyors and industrial locomotives.

For single-strand chain, the average tensile strength is 95,000 lb., maximum horsepower, 97 with a 19-tooth sprocket, and maximum speed, 240 r.p.m. The chain is made in single and multiple strands.

— 391 —

## Control Mechanism, Electric-Hydraulic

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.836]

A "hydraulic operator" control device has been developed to take the place of large a.c. and d.c. magnets and solenoids, and for the replacement of air cylinders, where quiet and smooth upward thrust is desired through a given distance on machine tools. The device consists of a motor-driven centrifugal oil pump, the impeller of which is mounted in a piston and driven by means of a splined shaft.

The operators are rated on the stalled thrust basis; that is, the number of pounds they will balance when the motor is running at full speed. The three standard sizes exert forces of 200, 300 and 600 lb. respectively. The speed of operation is slower than that of a solenoid, but it is still relatively fast. The motors used are small, ¼ to

¼ hp. The time required to raise the piston will depend upon the diameter and speed of the impeller, the diameter and length of the cylinder, and the load to be lifted. In the largest size without load, the piston will start in 0.1 sec. and will move through 6 in. total travel in 0.45 sec. With 300 lb. or half load, it will start in 0.35 sec. and complete the travel in 0.85 sec., and with maximum or stalled thrust load of 600 lb., it will not move at all or very slowly. Due to the stored energy in the revolving parts, the downward movement does not start until 0.3 of a second after the motor is de-energized, and, since the oil must be forced back through the revolving impeller blades, dashpot action results, and thus the piston requires 0.8 sec. for the total downward travel.

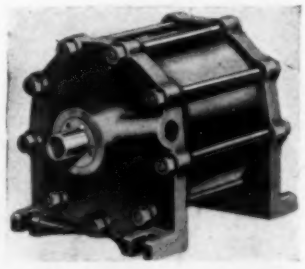
The device can be applied to brakes, clutches, door and window openers, spot welders and pumps.

— 392 —

## Cylinders, Air, Non-Rotating, Self-Adjusting

*Logansport Machine Co., Logansport, Ind.* [Vol.71,p.380]

This improved line of non-rotating air cylinders which are self-adjusted by air packing and are double-acting, retains the original design and principal



dimensions of the regular Logan cylinders, but has heavier construction throughout. The piston is machined for a No. 2 Morse taper. Five standard models in 11 sizes ranging from 1½ to 16 in. in bore, with any length of stroke, comprise the line.

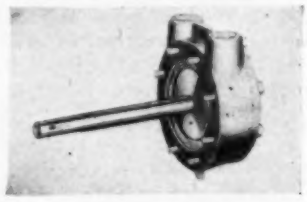
A packing cup compounded and molded for use with air is used. The air inlet and outlet are enlarged also.

— 393 —

## Pumps, Lubricant, Models MS, RS, and CS

*Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill.* [Vol.71, p.457]

To handle lubricating, coolant, and hydraulic service on machine tools, modified forms of the Models M. C, and R pumps known as Models MS, CS, and RS have been developed. The



pumps can be built into the construction of machines instead of being mounted on pads or pedestals.

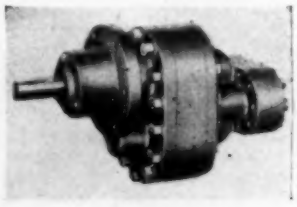
— 394 —

## Pumps, Oil, High-Pressure, Model H

*Tuthill Pump Co., 131 W. 63rd St., Chicago, Ill.* [Vol.71, p.480]

These pumps are supplied in four sizes, ranging in capacity from 12 to 50 g.p.m. against pressures up to 1,000 lb. per sq.in. A circular flange replaces the foot-type so that the Model H can be built into the machine. An angle-flange for foot-mounting is available.

An adapter flange is also used for both exhaust and intake ports instead of the conven-



tional pipe threads. This permits the use of the manifold best suited to the individual installation.

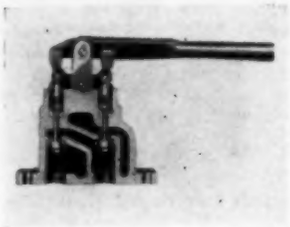
The design does away with the possibility of trapping the liquid when the gear-teeth mesh. Housings and end covers are close-grained, semi-steel castings with flat surfaces ground to a high finish so that no gaskets are required.

—395 —

## Valve, Control, for Hydraulic Cylinders.

*Ross Operating Valve Co., 6488 Epworth Blvd., Detroit, Mich.* [Vol.71,p.1063]

For the control of single- and double-acting cylinders, improved three-way and four-way valves have been placed on the



market. These valves contain several improvements. All ports are placed on one face. Other improvements consist of a poppet valve assembly which permits constant pressure packing and stronger and sturdier springs, composition disks that assure an air-tight seal, and hardened steel rockers. All four-way valves are now designed with a common intake port from the supply line.

These valves are manufactured in two styles, Type 4-P for double-acting cylinders, and Type 3-P for single-acting cylinders. Either style can be furnished with locking or non-locking type rockers in ¾-, 1-, 1¼- and 1-in. sizes. Larger sizes can be furnished.

# *Irons, Steels, and Alloys*

## — 396 —

### Iron, Chilled

*Fuller Lehigh Co., Fullerton, Pa.* [Vol.71,p.264]

A superior chilled iron is being marketed under the name of "Elverite." It is claimed to be an evolution of the "all-charcoal" chilling pig irons, and will give a hard chill to the required depth to suit the needs of the casting, while retaining a soft gray-iron core. It gives wear-resisting qualities combined with toughness required for castings.

## — 397 —

### Iron, High-Permeability, "Swedelec"

*A. Milne & Co., 745 Washington St., New York, N. Y.* [Vol.71,p.647]

An iron claimed to have high permeability and low hysteresis loss is being imported. The material is a Swedish-charcoal, Lancashire-iron product adapted for core parts where high permeability and low hysteresis loss are essential. The iron is a wrought or puddled metal and possesses altogether different properties from ingot metal. It may be used by manufacturers of railway signals, automatic safety control equipment, telephone switchboard equipment, and similar parts. It is obtainable in cold-drawn rounds, squares, flats, special shapes, and in cold-rolled, dead-soft annealed strips. Sizes for rounds and squares vary from ⅛ to 3 in., and for cold-rolled strips, from 0.010x3 in. wide to 0.250x6 in. wide.

## —398 —

### Chrome-Iron Alloys

*Rustless Iron Corporation of America, 122 E. 42nd St., New York, N. Y.* [Vol.71,p.647]

A series of four brands of rustless iron known as "Defirust," "Special Defirust," "Defistain," and "Defiheat," are being manufactured. The four brands are chromium-carbon alloys, and are manufactured for corrosion resistance, all of them containing a high percentage of chromium and a very small amount of carbon. The manufacturers claim for this iron homogeneity, softness, malleability, and ease of cold working. They also claim that a finished surface of the material may be easily brought to a high luster, and that the material is free from impurities.

Defirust contains 12 to 14 per cent of chromium, Special Defirust contains 16 to 18 per cent of chromium, Defistain contains 17 to 19 per cent of chromium, and Defiheat contains 25 to 30 per cent of chromium. Defirust only attains full resistance when properly polished. Special Defirust is highly corrosion resistant without polishing. Defistain will resist certain acids where Defirust and Special Defirust will fail. Defiheat has a resistance to corrosion higher than Defistain, but much greater heat resistance. Defistain and Defiheat are comparatively difficult to machine, but are also the two toughest of the four brands. All brands of the iron are furnished in the standard shapes and sizes.

## — 399 —

### Iron, Heat- and Abrasive-Resistant

*Jewell Steel & Malleable Co., Buffalo, N. Y.* [Vol.71,p.837]

A white-fracture, ductile iron, both heat and abrasive resistant, has a yield point of over 55,000 lb. per sq.in., ultimate strength of over 80,000 lb. per sq.in., and an elongation in 2 in. of 6 per cent. It retains a tensile strength of 21,500 lb. per sq.in. at 1,200 deg. F., making it particularly useful for parts subjected to high temperatures. Uniformity of analysis and structure is claimed. The Brinell hardness may be varied from 200 to 250. At hardnesses of 200 to 250 Brinell, the iron machines easily and smoothly.

## — 400 —

### Iron, Wear-Resistant, High-Strength, "Ermalite"

*Erie Malleable Iron Co., Erie, Pa.* [Vol.71,p.988]

An iron, known as "Ermalite" and having a structure consisting of a pearlitic matrix in which graphite particles are distributed evenly and with practically no free cementite, has been placed on the market. The material has a finer grain than the usual iron and is claimed to have good wearing properties, so much so that it is specified for brake drums. Its tensile strength is approximately 60,000 lb. per sq.in. The transverse strength of a 1-in. round bar on 12-in. centers with a load applied at the middle of the span is 6,500 to 7,000 lb. and the deflection ranges from 0.35 to 0.40 in. The Brinell hardness ranges from 240 to 250, but the material is not brittle. The company claims that the graphitic content makes the surface wear smoothly, and that a high coefficient of friction is maintained.

## — 401 —

### Alloys, Acid-Resistant

*Haynes Stellite Co., Kokomo, Ind.* [Vol.71,p.264]

These three acid-resistant alloys are known as Hastelloy "A," "C," and "D." Hastelloy "A" is designed for resistance to hydrochloric acid, but is also resistant to sulphuric and a number of other acids, but not to nitric acid. It has high strength and good ductility and makes excellent castings which can be forged or rolled into sheet, and are readily machineable. Hastelloy "C" is resistant to oxidizing agents such as nitric acid. The resistance to hydrochloric acid is maintained and the resistance to sulphuric acid slightly enhanced. It is used in the cast form, and is machineable. Hastelloy "D" gives resistance to sulphuric acid and to hydrochloric acid, but is not resistant to nitric acid. This alloy is machineable only with difficulty, unless tungsten-carbide tools are used. It can be ground readily, and is strong and tough.

## — 402 —

### Screw Stock, High-Manganese, Cold-Finished

*Joseph T. Ryerson & Sons, Inc., Chicago, Ill.* [Vol.71,p.563]

A cold-finished, high-manganese screw stock is an open-hearth steel containing a relatively high per cent of manganese, but it retains free machining qualities. The case-hardening properties of this stock are also good. The stock has a tensile strength of 76,000 lb. per sq.in. in its natural condition, with a Brinell hardness of 160. This may be increased by a water quench to a tensile strength of 130,000 lb. per sq.in. and a Brinell hardness of 300. Stock sizes are ¼ to 3 in. in diameter.

## — 403 —

### Steel, Chisel and Snap

*William Jessop & Sons, Ltd., 121 Varick St., New York.* [Vol.71,p.564]

A chisel and snap steel for hand and pneumatic chisels, boiler cups, snaps, punches, shear blades, and all shock-resisting tools, and for set-screws for holding cyanide-hardened dies, is being produced by William Jessop & Sons, Ltd., Brightside Works, Sheffield, England. This steel is an alloy steel that can be forged or hardened with ease in a blacksmith shop and does not require special hardening equipment.

It is delivered in a specially treated condition which removes the necessity for hardening any part of the tool except the working end. All standard octagon dimensions are available from stock, and round, flat, oval, and square sections are available on short notice. The stock contains about 2 per cent tungsten and 0.40 per cent carbon.

## — 404 —

### Steel, Die, Cold-Heading

*Vanadium Alloys Steel Co., Latrobe, Pa.* [Vol.71,p.566]

A carbon-vanadium tool steel made especially for cold-heading dies is being marketed under the trade name of "Vasco Colhed." The steel contains a higher vanadium content than "Vasco Special" and is manufactured in one carbon range only. It is processed so that the centers of the bars are sound, and both ends of each bar are inspected for sponginess and non-metallic inclusions by the deep-acid etch method before shipment.

Vasco Colhed can be hardened through a wide temperature range and can be quenched in brine from a temperature as high as 1,800 deg. F., without danger of breakage.

## — 405 —

### Steel, Die and Tool, Air-Hardening

*Colonial Steel Co., Pittsburgh, Pa.* [Vol.71,p.570]

This high-carbon, high-chromium, air-hardening die and tool steel that can be hardened in a still air from 1,825

deg. F. and shows a hardness of 605 Brinell in a section 6 in. square by 18 in. long, may be used for body dies and complicated dies where still-air hardening is necessary. The manufacturers claim for this steel no warpage, easy machinability, and uniformity in hardening.

### — 406 —

### Steel, Tool, High-Speed,

*Edgar Allen Steel Co., Inc., 741 Washington St., New York. N. Y.* [Vol.71,p.607]

To obtain the requisite uniform quality, this steel is manufactured in a high-frequency electric furnace claimed to eliminate sulphur, phosphorus, and other impurities that are detrimental to this type of steel. The steel is to be used for boring tools, lathe tools, planing tools, and slotting and forming tools where great speeds and heavy cuts are demanded. It is supplied in the usual bar sections and in forged flanges and also may be obtained for toolholders in small pieces ready hardened for use. It may be hardened either in a blast of cold air or in oil. This steel may also be used for machining high-manganese steels.

### — 407 —

### Steel, Die, "Albor"

*William Jessop & Sons, Ltd., 121 Varick St., New York, N. Y.* [Vol.71,p.608]

A carbon-chromium alloy steel specially adapted for stamping white gold and hard metal used in the manufacture of jewelry is being manufactured by William Jessop & Sons, Ltd., Sheffield, England, and is being marketed in New York. The steel contains about 0.90 per cent carbon, 0.90 per cent chromium and 0.30 per cent molybdenum. An unusual depth of hardness is claimed, together with ease of machining after being annealed by a special process. The steel may be drawn by color.

### — 408 —

### Steel, Corrosion-Resistant, "Durimet"

*Duriron Co., Dayton, Ohio.* [Vol.71,p.647]

A steel intended to resist the action of hot weak solutions of sulphuric acid is being marketed under the name of "Durimet." Three varieties of the steel are available, listed as "A," "B," and "D," all containing high percentages of nickel and silicon. Durimet A contains 25 per cent nickel, 5 per cent silicon, a trace of chromium, and 0.25 per cent carbon. Durimet B contains 35 per cent nickel, 5 per cent silicon, 12 per cent chromium, and 0.25 per cent carbon. Durimet D contains 15 per cent nickel, 3 per cent silicon, 2.5 per cent chromium, and 0.60 per cent carbon.

The physical characteristics of the Durimet grades vary slightly with different compositions. Durimet A has a tensile strength of 100,000 lb. per sq.in., as rolled. It has a hardness of 160 Brinell, as rolled. The A and B grades can be furnished in the form of hot- or cold-rolled bars, sheets and plates, ground and polished shafting wire, rivets, bolts and nuts, and castings. The D grade, at the present time, is only furnished in the form of castings. One application of Durimet is in the construction of pickling apparatus.

## *Miscellaneous Equipment and Supplies*

### — 409 —

### Absorbed Oils and "Cosmolubrics"

*E. F. Houghton & Co., Philadelphia, Pa.* [Vol.71,p.564]

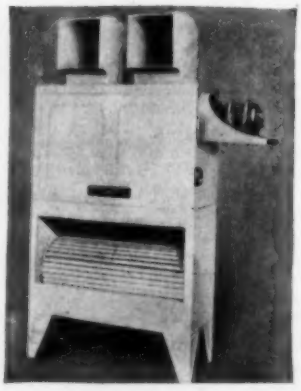
A complete line of absorbed oils and "Cosmolubrics" for plant lubrication is being introduced. Several of the oils have been previously marketed, but oils of all weights and for all uses have not been available. The absorbed oils consist of two oils in one, a film oil and a "lubricity" oil. The line of "Cosmolubrics" contains all oils from very light body to extremely heavy body oils.

### — 410 —

### Air Conditioner and Heater, "Wetboy"

*Buffalo Forge Co., Buffalo, N. Y.* [Vol.71,p.1062]

For supplying conditioned air as well as heat, the "Wetboy" has been placed on the market. The apparatus consists of a revolving air-washing drum, a unit heater system directly above, a motor-driven blower section, and the duct connections or outlets. The air washer removes about 70 per cent of the dirt and dust from the air and



adds from 25 to 35 per cent moisture. The water level is maintained by means of a float.

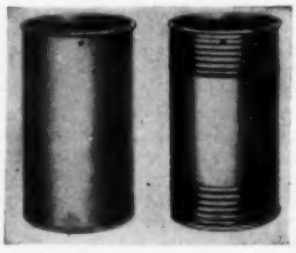
The multi-rotors are of the centrifugal type, each in its own fan housing, designed to deliver a large volume of air quietly and efficiently. The motor bracket endplate and the outboard endplate are interchangeable so that the drive can be placed on either end.

### — 411 —

### Barrels, Steel

*Detroit Steel Barrel Co., Toledo, Ohio.* [Vol.71,p.1066]

"Detroit" steel shop barrels will not leak oil when filled with machined products. The No. 4 barrel, illustrated at the left in the accompanying illustration, and the No. 5, illustrated at the right, are both



liquid tight, both being made with a No. 16 gage shell and a 14 gage bottom. They stand 30 in. high, are 17⅞ in. in outside diameter at the chime, and 16¾ in. in inside diameter of the shell. They have a capacity of 30 gallons and weigh 47 lb. If desired these barrels may be equipped with trunnions, and may also be furnished in 50-gal. capacities.

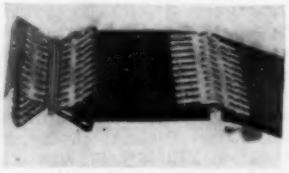
### — 412 —

### Belt Lacing, Steel, Flexible, "Steelgrip"

*Armstrong-Bray & Co., 28 N. Clinton St., Chicago, Ill.* [Vol. 71,p.1066]

This belt lacing is made of heat-treated steel. The joint is made with a steel rocker pin, which is composed of two segments, one rocking against the other.

Steelgrip belt lacing may be



used for leather, fabric, or composition belts, and may be applied by means of a hammer. When in place it is smooth on both sides and flexible. It is made for $\frac{3}{16}$- to $\frac{1}{2}$-in. belts.

### — 413 —

### Bench Legs and Benches, T-Iron

*Whitney Metal Tool Co., Rockford, Ill.* [Vol.71,p.1027]

T-iron sections are assembled by riveting and welding to form these bench legs. The additional strength obtained in the T-iron sections permits building up a bench which will resist the shock of heavy blows.

The bench surface is built up by putting a 15x1⅝-in. plank on the leg to support the flooring and absorb the shock. A 5½x1¾-in. plank is mounted edgewise and securely bolted to the bracket and the leg and provides a back rest for the flooring and also acts as a cushion support. Over these is laid a ¾-in. hard maple flooring to provide a serviceable surface for all heavy work.

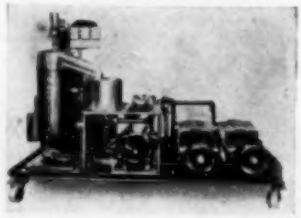
The bench legs are also made up into benches available from the above manufacturer. All bench surfaces are 31½ in. from the floor and 32 in. wide and are obtainable in lengths from 6 to 16 ft. by increments of 2 feet.

### — 414 —

### Centrifuge and Filter Press, Oil, "Westinghouse-Sharples"

*Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.* [Vol.21,p.1060]

Claimed to be the largest portable combination centrifuge and filter press on the market, the combination Sharples super-



centrifuge and Westinghouse filter-press oil purifier is being offered through the above concern. The first unit is made by

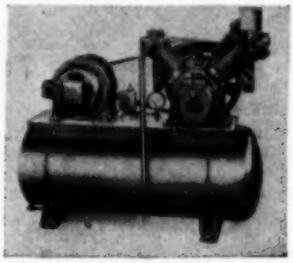
the Sharples Specialty Co., 23rd and Westmoreland Sts. Philadelphia, Pa. The following advantages are claimed for the equipment: Thorough cleaning of 1,200 gal. of oil per hour; purification complete in one operation; simple operation; practically no oil loss in handling; sturdy construction, and low maintenance. Floor space, 54 by 106 inches.

## — 415 —

### Compressors, Air, Two-Stage, Air-Cooled, Type 30

*Ingersoll-Rand Co., 11 Broadway, New York, N. Y.* [Vol. 71,p.1062]

A V-type belt drive is employed. Both the motor and the compressor are equipped with ball bearings. The units are self-contained, the motor and the



compressor being mounted on a steel base attached to the top of the air reservoir. The latter is built to withstand a working pressure of 200 lb. per sq.inch.

An intercooler is located behind the fan-type flywheel. Automatic stop and start controls are furnished as standard.

Honed cylinders and two oil-control rings reduce the oil in the discharge air to a minimum. The base of the compressor unit forms a reservoir for the oil.

The compressor unit is built in four sizes, ¾, 1½, 3 and 5 hp. All sizes are built for working pressures up to 200 lb. per sq.in., continuous duty.

## — 416 —

### Deep-Drawing Compound "Drawsol"

*D. A. Stuart & Co., 2727 S. Troy St., Chicago, Ill.* [Vol.71, p.491]

For lubrication in the deep-drawing of steel, copper, and brass parts, an improved lubricant known as "Drawsol" has been developed. It is claimed that this material offers the respective advantages of each of the three types of drawing lubricants now in general use, as follows: Soluble oil or paste type; pigment type, and the heavy oil type.

Drawsol, when properly mixed with water, will not separate, but will maintain its consistency indefinitely. It is easy to remove; will not stain, and is a rust preventive.

## — 417 —

### Desks, Drawing, "Lehigh"

*W. W. Kimball Co., Kimball Building, Chicago, Ill.* [Vol.71, p.837]

Two desks applicable to use in industrial plants have been developed by the Department of Mechanical Engineering, Lehigh University, Bethlehem, Pa. The first desk is intended particularly for college classrooms and has drawer space for four men. Two men may work at one desk at the same time, one at each side. The second desk is of the wall type and should be of convenience to engineer

executives who have occasional use for such furniture when checking plans or making sketches.

The classroom desks are made of polished, quarter-sawed oak, and have tops 66 by 36 in. The mid-portion of the desk is horizontal for a width of 12 in. and then slopes toward the ends, where it extends 18 in. beyond the drawers, giving ample knee room to the workers. The fixed top slopes 1 in 6½.

The Lehigh "Junior" drawing desk is intended for use in offices. When not in use, it has the appearance of a cabinet 46x39x5 in. deep, fastened to the wall and extending to the floor. The cabinet is also of polished, quarter-sawed oak, and contains a soft-pine drawing board, exposed by tilting down the swinging front of the cabinet. The drawing board is hinged at the top and may be supported at the desired slope by the edge of the tilting front resting on one of a series of stops on the bottom of the board.

## — 418 —

### Hacksaw Blades, High-Speed-Steel, "Red Streak"

*Simonds Saw & Steel Co., Fitchburg, Mass.* [Vol.71,p.606]

An improved series of high-speed hacksaw blades is being manufactured. A different steel is being used for the blade, and an improved setting device is used to make the set of the teeth uniform. A feature of this line is the fool-proof marking by which the "pull" end of the blade is designated. The blade is available in all standard sizes for both hand and power saws. The tungsten blade is marked with a red end, the high-speed blade with a red back.

## — 419 —

### Fixture Lock

*Siewek Tool Co., 10232 Woodward Ave., Detroit, Mich.* [Vol.71,p.906]

For use in drilling fixtures, milling fixtures, vises, and special machinery, a fixture lock has been developed. By rotating the handle, motion is imparted to the cam ring. This, in turn, by virtue of its eccen-

tricity and a spring, causes the cam to rotate a shaft. When motion of the shaft ceases, because of the resistance from clamping the work, the cam also becomes stationary, but the handle and cam ring being still free to rotate, become locked by wedging between the cam and the housing, at the same time compressing the spring. Movement of the cam and the shaft is then impossible, because of the wedge action of the cam ring. To release, the handle is rotated in the opposite direction, whereupon the spring centralizes the cams and the shaft is free to be rotated in the opposite direction.

## — 420 —

### Inkstand, Draftsman's

*National Tool Engineering Co., P. O. Box 712, Indianapolis, Ind.* [Vol.71,p.456]

Designed to take a ¾-oz. glass ink bottle of any make, a draftsman's pen-filling inkstand is being marketed. The bottle is held in place by a steel spring

clip. The top of the device swings back and stays up so that the stopper can be put back in the bottle when the ink is not in use. To use the device, the draftsman pushes the ring down with the little finger and applies the ruling pen to the filler pen. The top then drops into place, sealing the bottle.

The body, ring, and top of the inkstand are of cast iron and are finished in gold crystal baked enamel. The weight is about 1¾ pounds.

## — 421 —

### Jacks, Self-Lowering, Safety

*Buda Co., Harvey, Ill.* [Vol. 71,p.605]

Several important features have been added to the line of safety self-lowering jacks made in four sizes of 35-, 50-, 75- and 100-ton capacity and designed for railroad shop use, although they also have general shop application. In each case, the extended height is 26 in., instead of the usual 24 for railroad work, and the rise varies from 18 in. in the case of the 35-ton jack to 15 in. in the 100-ton.

Some of the features are: Use of automatic locking key to prevent ram from turning while lifting the load; release of automatic key to allow ram to lower without load; improved lever socket with the pawl and ratchet packed in grease; a one-piece electric steel casing; and direct lubrication to the bronze nut.

Ball bearings are used

throughout. The gears are forged of alloy steel, heat-treated, and the worm on the ratchet shaft is also a special alloy steel. Control of the speed of lowering is through a brake wheel mounted on an auxiliary shaft, driven through a worm and wheel and carried on ball bearings. Another feature of the jack is a safety device to prevent the ram or standard from being raised to a dangerous point.

## — 422 —

### Lacquers, Insulating and Oil-Protecting

*General Electric Co., Schenectady, N. Y.* [Vol.71,p.71]

This series of lacquers, made in colors for use where an oil-resistant, highly - protective, durable, and flexible insulating

coating is demanded, will adhere to galvanized iron and aluminum and serve as protection against rust. They are easily applied, are not affected by high temperatures as much as ordinary paint.

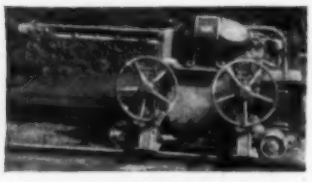
The lacquers are available in five colors: Red, blue, brown, green, and aluminum. They may be applied by brushing, spraying, or dipping.

## — 423 —

### Locomotive Mover, Electric

*Whiting Corporation, Harvey, Ill.* [Vol.71,p.719]

This electric locomotive mover is designed to save time and labor in moving dead engines, to lessen repair time, and reduce locomotive dead time. This patented machine consists of a steel structure 3 ft. in height mounted on four flanged



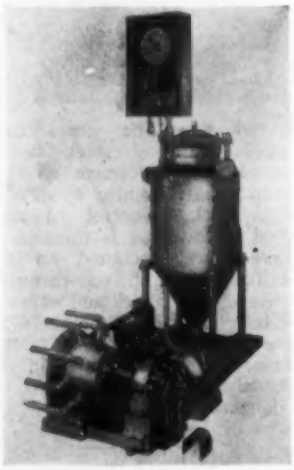
wheels equipped with roller bearings, the wheels spaced for standard gage track. A 5-hp. motor drives the horizontal beam.

## — 424 —

### Lubricating System, "Pneuma-Lectric"

*Keystone Lubricating Co., 21st, Fairfield & Lippencott Sts., Philadelphia, Pa.* [Vol. 71,p.522]

For the delivery of grease to a rotary distributor and thence to various lines leading to bear-



ings in a machine, the "Pneuma-Lectric" lubricating system has been placed on the market. The distributor is operated by a motor controlled by a "Tork" electric clock adjustable for operation at intervals of once in five minutes to once in 24 hours.

## — 425 —

### Molding Platens, Electrically-Heated

*Harold E. Trent Co., 439-43 N. 12th St., Philadelphia, Pa.* [Vol.71,p.722]

Temperatures that may be varied up to 600 or even 800 deg. F. may be obtained on the electrically-heated platens developed for molding plastic resinous compounds. The platens,

which have renewable ground surfaces, can be made up to 40 in. square, and the temperature varied for molding the various types of compounds. The heating element is designed to have a low temperature gradient.

## — 426 —

### Pot, Tinning

*Harold E. Trent Co., 439 N. 12th St., Philadelphia, Pa.* [Vol. 71,p.337]

Made only in the single-heat type for 110-volt circuits, this tinning pot consumes 355 watts. The inside dimensions are 4 in.

in diam. by ½ in. deep. This pot can be supplied with a depth of only ¼ in., if desired.

## — 427 —

### Stand, Die-Holding, Universal

*Davenport Locomotive & Manufacturing Corporation, Davenport, Iowa.* [Vol.71,p.609]

Ease and rapidity of mounting dies and convenient working are important features of this universal die-holding stand. The block may be set at any angle and also at any height. The stand is built to accommodate blocks weighing up to 1,500 and 3,000 lb.

The universal-head fixture is made of steel and is tilted by

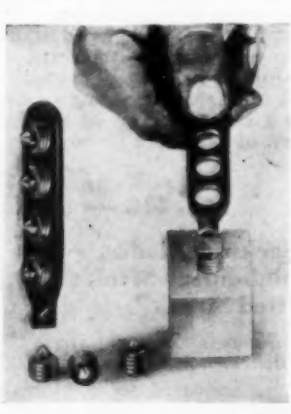
means of a handwheel operating through a worm and segment gear. The die is held firmly in place by means of two adjustable clamps. These clamps are fastened to the table by means of T-bolts engaging T-slots in the surface. The work may be raised or lowered by means of a central handwheel and is locked in position.

## — 428 —

### Thread Button Set, "Make-Shur"

*National Machine Tool Co., Racine, Wis.* [Vol.71,p.686]

A device for locating holes for body screws in a plate which is to be secured to a piece in which the threaded holes do not



extend all the way through is being manufactured. The manufacturers claim that a layout for this sort of hole is not needed when the set is used. The device incorporates four thread center punches held in a combination holder and socket wrench. The center punches are screwed into the tapped hole, point outward, by means of a hexagon-head screw.

## — 429 —

### Truck, Die and Tool, Welded

*Pollard Brothers Manufacturing Co., 4043 N. Tripp Ave., Chicago, Ill.* [Vol.71,p.908]

This die and tool truck with a capacity of 2,000 lb. is braced in all directions and is constructed by means of electric

arc welding. The top plate is also braced underneath. The total height of the truck is 35 inches.

The casters used have 5-in. semi-steel, turned wheels with roller bearings. The housing or forks are of steel.

## — 430 —

### Wall Chart, of Drill and Tap Sizes

*National Twist Drill & Tool Co., Detroit, Mich.* [Vol.71,p. 724]

A wall chart covering decimal equivalents, tap drill sizes, and hints for twist drill users has been published. The chart is made in three folds for convenience and contains information which should be of interest to all shop mechanics and draftsmen.

## — 431 —

### Wrapper, Rust-Preventive, "No-Ox-Id"

*Dearborn Chemical Co., 310 S. Michigan Ave., Chicago, Ill.* [Vol.71,p.723]

A wrapper designed to protect finished surfaces between operations, and also for service as a wrapper to protect the finished product in shipment is being manufactured. The wrapper is used in conjunction with No-Ox-Id Rust Preventive, a brushed-on preparation for preventing rust. It is produced of a fabric impregnated with No-Ox-Id of a different type than the one used for coating. This fabric may be wrapped around the surfaces over the coating of No-Ox-Id, and will conform to various contours.

# INDEX OF MANUFACTURERS

## American Section


### — A —

**Abrasive Machine Tool Co.,**
East Providence, R. I.
Surface grinding machine, No. 5 ..... 78 92

**Adams Co.,**
Dubuque, Iowa.
Milling head for planers.....168 107

**Adjustable Lap & Tool Co., Inc.,**
311 N. Second St., St. Louis, Mo.
Lapping machine for air hammer cylinders .....101 96

**Advance Diamond Tool Co.,**
427 W. Congress St., Detroit, Mich.
Combination grinding and lapping machine for tungsten-carbide tools ..... 98 96
"Bull Dog" tungsten-carbide-tipped tools .....370

**Allen-Bradley Co.,**
286 Greenfield Ave., Milwaukee, Wis.
Overload breakers, Bulletin 825.272 123
Starters, Bulletin 711-712.....278 124
Splash-proof, motor-starting switch .....286 125

**Allen Steel Co., Inc., Edgar**
741 Washington St., New York, N. Y.
"Imperial Major" high-speed tool steel .....406 140

**Alliance Tool Co.,**
Alliance, Ohio.
Planer jacks, Style 1945.....173 107
Toolmaker's equipment .....384 137

**Amalgamated Metal & Machine Co.,**
Cleveland, Ohio.
Semi-automatic broaching machine .....214 114

**American Electric Furnace Co.,**
26 Von Hillern St., Boston, Mass.
High-speed electric furnace, Type HB .....291 125

**American Flexible Coupling Co.,**
Erie, Pa.
Flexible coupling .....321 129

**American Tool Works Co.,**
Cincinnati, Ohio.
Electric controls for radial drills ..... 35 85
Power rapid traverse for "Auto-Oiled" shapers .....170 107

**Ampco Twist Drill Co.,**
Jackson, Mich.
Lathe mandrel, "4-in-1" .....141 102

**Apex Machine Co.,**
Dayton, Ohio.
Universal joint nut setters.....360 134
Friction chuck for electric and air tools .....375 136
Floating tap sleeve .....382 137
Floating toolholders .....383 137

**Armour Electric Manufacturing Co.,**
1020 Holland St., Erie, Pa.
Totally-inclosed, fan-cooled motors .....269 128

### — A —

*(Continued)*

**Armstrong-Blum Manufacturing Co.,**
333-357 N. Francisco Ave., Chicago, Ill.
Metal bandsaw, No. 8.....211 114

**Armstrong-Bray & Co.**
28 N. Clinton St., Chicago, Ill.
"Steelgrip" flexible belt lacing..412 140

**Arter Grinding Machine Co.,**
15 Sagamore Road, Worcester, Mass.
Automatic cylindrical grinder, No. 132 ..... 67 91
Rotary surface grinder, 12-inch. 76 92

### — B —

**Baker Bros., Inc.**
Toledo, Ohio.
Improved horizontal boring machine, No. 25 HH..... 9 80

**Barber-Colman Co.,**
Rockford, Ill.
Production hobbing machine, Type "B" ..... 60 90

**Barnes Drill Co.,**
814 Chestnut St., Rockford, Ill.
Sliding-head, self-oiling, all-geared, drilling and tapping machine, No. 262..... 20 82
Production-type, all-geared, drilling and tapping machine, No. 221½ ..... 23 83
Production-type, all-geared drilling machine, No. 242 ..... 24 83
Two-spindle production gang drill, No. 242 ..... 26 83

**Bath & Co., John**
18 Grafton St., Worcester, Mass.
Adjustable plain plug gage ....262 122

**Baush Machine Tool Co.,**
Springfield, Mass.
Two-spindle nut driving machine .....231 117

**Beatty Machine & Manufacturing Co.,**
Hammond, Ind.
Heavy-duty toggle presses.....188 110

**Bellevue Industrial Furnace Co.,**
2971 Bellevue Ave., Detroit, Mich.
High-temperature electric furnace, Type SV .....292 126

**Binks Manufacturing Co.,**
3114-26 Carroll Ave., Chicago, Ill.
Sprayer unit .....303 127

**Black & Decker Manufacturing Co.,**
Towson, Md.
Portable bench grinder, 6-inch..105 97

**Bliss Co., E. W.,**
53 St. & Second Ave., Brooklyn, N. Y.
High-production press, No. 630..182 109

### — B —

*(Continued)*

**Blount Co., J. G.,**
Everett, Mass.
Tap grinder ..... 95 95
All-purpose tool grinder..... 96 95
Wet tool grinder for tungsten-carbide tools ..... 99 96

**Bonney Forge & Tool Works,**
Allentown, Pa.
Chrome-vanadium, double-hexagon sockets and wrenches...380 136

**Boye & Emmes Machine Tool Co.,**
Cincinnati, Ohio.
"Coneless" lathe, 16-inch .....129 100

**Bradford Machine Tool Co.,**
657-671 Evans St., Cincinnati, Ohio.
Three-head drilling and reaming machine ..... 42 86

**Brake Synchrometer Co.,**
87 Lincoln St., Boston, Mass.
Brake-testing machine .....238 118

**Breuer Electric Manufacturing Co.,**
852 Blackhawk St., Chicago, Ill.
"Tornado" portable electric paint sprayer .....305 127

**Brisben, Ernest J.,**
14203 Orinoco Ave., E. Cleveland, Ohio.
Toolholder .....140 102

**Brown & Sharpe Manufacturing Co.,**
Providence, R. I.
Gear hobbing machine ..... 57 89
Releasing die-holder .....142 102
Plain plug and ring gages.....263 122
Micrometer caliper, No. 24.....264 122
Micrometer caliper, No. 54 ....265 122
Wire gage selectors, No. 698 A and 698 B .....266 122

**Bryant Chucking Grinder Co.,**
Springfield, Vt.
Deep-hole grinder, No. 24..... 72 91
Heavy-duty grinder, No. 3.... 73 92
Semi-automatic hole grinder, No. 12 ..... 75 92

**Buda Company,**
Harvey, Ill.
Safety self-lowering jacks .....421 141

**Buffalo Forge Co.,**
Buffalo, N. Y.
Sliding-head drill, 14-inch..... 16 81
Sensitive drilling machines, 16-inch ..... 27 84
Bending attachment for bending machines .....253 121
"Wetboy" unit heater and air conditioner .....410 140

**Busch-Sulzer Bros. Diesel Engine Co.,**
St. Louis, Mo.
Hydraulic molding press.....248 120

### — C —

**Canedy-Otto Manufacturing Co.,**
Chicago Heights, Ill.
Multiple-spindle drills ..... 10 82
Sliding-head, back-geared, sensitive drill, 21-inch..... 29 84
Sliding-head, sensitive drill, 15-inch ..... 30 84

## C

(*Continued*)


| | No. | Page |
|---|---|---|
| **Chambersburg Engineering Co.,** Chambersburg, Pa. | | |
| Steel-side presses | 178 | 108 |
| Steam drop hammer, 24,000-pound | 245 | 119 |
| **Chicago Pneumatic Tool Co.,** 6 E. 44th St., New York, N. Y. | | |
| Rotary grinder, No. 88 | 116 | 98 |
| **Cincinnati Bickford Tool Co.,** Oakley, Cincinnati, Ohio. | | |
| "Super-Service" radial drill, 11-in. column | 31 | 84 |
| **Cincinnati Grinders Incorporated,** Cincinnati, Ohio. | | |
| Brake drum grinder | 87 | 94 |
| Floor-level hopper for centerless grinders | 119 | 98 |
| Hopper, in-feed, for centerless grinders | 120 | 98 |
| Hopper, through-feed, "Feed-matic," for centerless grinders | 121 | 99 |
| Hopper for feeding tapered parts | 122 | 99 |
| **Cincinnati Lathe & Tool Co.,** 3207 Disney St., Cincinnati, Ohio. | | |
| "Maxi-Production" lathe | 130 | 100 |
| **Cincinnati Milling Machine Co.,** Cincinnati, Ohio. | | |
| Cutter grinder, No. 2 | 97 | 95 |
| Fixture for grinding support blades of centerless grinders | 117 | 98 |
| Improved milling machine, Type M | 154 | 104 |
| "Hydromatic" milling machine, No. 3-24 | 155 | 104 |
| Plain, universal, and vertical milling machines, No. 3 | 159 | 105 |
| **Cincinnati Shaper Co.,** Cincinnati, Ohio. | | |
| Gear burnisher | 62 | 90 |
| Heavy-duty shapers, 24- and 16-inch | 165 | 106 |
| **City Machine & Tool Works,** 1517 E. 3rd St., Dayton, Ohio. | | |
| "Bolender" gear grinding chuck | 66 | 91 |
| **Clark, Jr., Electric Co., Jas.,** Louisville, Ky. | | |
| "Wonder" electric drill, ¼-inch, No. 000U | 48 | 88 |
| **Cleveland Automatic Machine Co.,** Cleveland, Ohio. | | |
| Five-spindle, hydraulic, chucking machine, 7-inch, Model M | 11 | 80 |
| **Cleveland Twist Drill Co.,** Cleveland, Ohio. | | |
| Tungsten-carbide-tipped drills and reamers | 362 | 135 |
| **Coates Machine Tool Co., Inc.,** 110-112 W. 40th St., New York, N. Y. | | |
| "Elasticometer" spring tester, Type R-80 | 259 | 122 |
| **Cochrane-Bly Co.,** Rochester, N. Y. | | |
| Automatic, high-speed saw, No. 21 | 222 | 115 |
| Metal sawing machine, No. 55 | 223 | 116 |
| Improved metal sawing machine, No. 66 | 225 | 116 |
| **Colonial Steel Co.,** Pittsburgh, Pa. | | |
| Air-hardening die and tool steel | 405 | 139 |
| **Colt's Patent Fire Arms Manufacturing Co., Autosan Machine Division,** Hartford, Conn. | | |
| Two-tank, metals parts cleaner | 239 | 118 |


## D

(*Continued*)


| | No. | Page |
|---|---|---|
| **Conradson Tool Co.,** 2101 Indiana Ave., Chicago, Ill. | | |
| Expanding reamer and arbor | 365 | 135 |
| **Cross Gear & Engine Co.,** 3250 Bellevue Ave., Detroit, Mich. | | |
| Gear tooth rounder | 64 | 90 |
| **Cutler-Hammer, Inc.,** 12th St. & St. Paul Ave., Milwaukee, Wis. | | |
| Automatic, across-the-line starter for d.c. motors | 279 | 124 |
| Rubber-mounted toggle switch | 280 | 124 |


## D


| | No. | Page |
|---|---|---|
| **Danly Machine Specialties, Inc.,** Chicago, Ill. | | |
| Die sets | 187 | 110 |
| **Davenport Locomotive & Manufacturing Corporation,** Davenport, Iowa | | |
| Universal die-holding stand | 427 | 142 |
| **Davis & Thompson Co.,** 57th Ave. & Mitchell St., Milwaukee, Wis. | | |
| Twelve-spindle, vertical, continuous drilling machine | 41 | 86 |
| "Rotomatic," continuous pipe threading machine, No. 3 | 201 | 112 |
| **Dearborn Chemical Co.,** 310 S. Michigan Ave., Chicago, Ill. | | |
| "No-Ox-Id" rust preventive wrapper | 431 | 142 |
| **Defiance Machine Works,** Defiance, Ohio | | |
| Valve-hole, drilling, reaming, counterboring, and spot facing machine | 38 | 86 |
| Two-way opposed, horizontal boring and reaming machine | 10 | 80 |
| Special heavy-duty drilling machine, 36-inch | 43 | 87 |
| Aluminum airplane propeller turning lathe, No. 613 | 139 | 102 |
| **Detroit Steel Barrel Co.,** Toledo, Ohio | | |
| Steel shop barrels | 411 | 140 |
| **DeWalt Products Corporation,** Leola, Lancaster County, Pa. | | |
| Improved "Wonder Worker" saw, Model D | 349 | 133 |
| **Diamond Chain & Manufacturing Co.,** Indianapolis, Ind. | | |
| Roller chain, 2½-inch pitch, No. 480 | 390 | 138 |
| **Diamond Machine Co.,** 9 Codding St., Providence, R. I. | | |
| Face grinding machine | 71 | 91 |
| **Dreis & Krump Manufacturing Co.** 74th St., & Loomis Blvd., Chicago, Ill. | | |
| Overhead-drive gap shear | 189 | 110 |
| **Dumore Co.,** Racine, Wis. | | |
| No. 5 grinder | 149 | 103 |
| **Duriron Co., Inc.,** Dayton, Ohio | | |
| "Durimet" corrosion-resistant steel | 408 | 140 |
| **Duro-Friction Clutch Co.,** Grand Rapids, Mich. | | |
| Friction-driven countershaft | 322 | 130 |


## E

(*Continued*)


| | No. | Page |
|---|---|---|
| **Eastern Machine Screw Corporation,** New Haven, Conn. | | |
| "H & G" chaser grinder | 95 | 95 |
| "H & G" threading machine | 198 | 112 |
| "H & G" self-opening diehead, Style D | 203 | 112 |
| **Edgemont Machine Co.,** 2200 Home Ave., Dayton, Ohio | | |
| Disk clutch, Type SF | 319 | 129 |
| **Edlund Machinery Co., Inc.,** Cortland, N. Y. | | |
| Production-type, drilling machine, 24-inch, No. 1A | 25 | 83 |
| **Electric Portable Co.,** 879 E. Harrison St., Portland, Oregon | | |
| "Economy" lamp guard | 287 | 125 |
| **Electric Sprayit Co.,** 320 E. Colfax Ave., South Bend, Ind. | | |
| "All-Purpose" spraying equipment | 304 | 127 |
| **Elwell-Parker Electric Co.,** Cleveland, Ohio | | |
| Electric lift truck, Type EQ | 298 | 126 |
| **Enterprise Manufacturing Co.,** Third & Dauphin Sts., Philadelphia, Pa. | | |
| Station-type drilling machine | 44 | 87 |


## F


| | No. | Page |
|---|---|---|
| **Erie Malleable Iron Co.,** Erie, Pa. | | |
| "Ermalite" high-strength, wear-resistant cast iron | 400 | 139 |
| **Ex-Cell-O Aircraft & Tool Corporation,** Detroit, Mich. | | |
| Grinding machine spindles | 123 | 99 |
| **Fafnir Bearing Co.,** New Britain, Conn. | | |
| Airplane-type ball bearings | 385 | 137 |
| **Farrel-Birmingham Co.,** 344 Vulcan St., Buffalo, N. Y. | | |
| Metal-forming mill | 247 | 120 |
| **Fay & Egan Co., J. A.,** Oakley, Cincinnati, Ohio | | |
| Electric, double-arbor, universal saw, No. 575 | 350 | 133 |
| **Federal Press Co.,** Elkhart, Ind. | | |
| Punch press for large light work, No. 33 | 177 | 108 |
| **Federal Products Corporation,** Providence, R. I. | | |
| Small hole gage, Model 36 | 260 | 122 |
| **Fellows Gear Shaper Co.,** Springfield, Vt. | | |
| Gear shaper, No. 6A | 61 | 90 |
| **Ferner Co., R. Y.,** Investment Bldg., Washington, D. C. | | |
| Societe Genevoise jig boring machine | 4 | 79 |
| **Firth-Sterling Steel Co.,** McKeesport, Pa. | | |
| "Firthite" mechanically-held, tungsten-carbide-tipped tools | 369 | 135 |
| "Dimondite" tungsten-carbide cutting metal | 372 | 136 |
| **Flannery Manufacturing Co.,** Flannery Bldg., Pittsburgh, Pa. | | |
| "Niclad" heat-resisting pot | 294 | 126 |

## — F —

(*Continued*) No. Page

**Foote Bros. Gear & Machine Co.,**
215 N. Curtis St., Chicago, Ill.
Worm gear speed reducers, Type HGX ..... 316 129

**Foote-Burt Co.,**
Cleveland, Ohio
Hydraulic- and mechanical-feed drilling machines, No. 16.... 17 82
Surface broaching machine, No. 1 ..... 213 114

**Foster-Johnson Reamer Co.,**
Elkhart, Ind.
Reamers for railroad motion work ..... 364 135

**Frew Machine Co.,**
124 W. Venango St., Philadelphia, Pa.
Automatic tapping machine, No. 2 ..... 200 112

**Fuller-Lehigh Co.,**
Fullerton, Pa.
"Elverite" chilled iron..... 396 139

**Fusion Welding Corporation,**
103rd St. & Torrence Ave., Chicago, Ill.,
"Carbo-Flux" arc welding generator ..... 327 130
"Yellow Jacket" electrode, No. 18 ..... 333 131
"Weldite" welding rod, Type T. 336 131
"Weldite" welding rod, Type S. 337 131

## — G —

**Gairing Tool Co.,**
Detroit, Mich.
Swing-tool boring head..... 357 134

**Gallmeyer & Livingston Co.,**
Grand Rapids, Mich.
Surface grinder, No. 3..... 79 93
Drill grinder ..... 88 94

**Gardner Machine Co.,**
Beloit, Wis.
Special hexagon nut grinder, No. 84 ..... 85 94
"Super" disk grinder, 40-inch, No. 9 ..... 106 97
Double-spindle polishing lathe, No. 3-DA ..... 312 128

**General Electric Co.,**
Schenectady, N. Y.
Planer control apparatus..... 169 107
Single-phase, squirrel-cage, capacitor motors, Type KC.... 271 123
Multi-finger relay..... 275 123
Magnetic switch No. CR 6005-D-30 ..... 282 124
Small-capacity, oil-immersed, magnetic switch..... 283 124
Track-type limit switch..... 285 125
Furnace for heat-treating aluminum castings..... 289 125
Conveyor-type, small-parts heat-treating furnace..... 290 125
Welding electrode holder..... 340 131
Electric-hydraulic control mechanism ..... 391 138
Insulating and oil-protection lacquers ..... 422 141

**General Welding & Equipment Co.,**
66 Brookline Ave., Boston, Mass.
Six-torch automatic shape-cutting machine..... 249 120

**Geometric Tool Co.,**
New Haven, Conn.
Universal chaser-grinding fixture ..... 118 98
Solid, adjustable diehead, Style KJ ..... 202 112
Adjustable taps, Classes SJ & R. 204 113

## — G —

(*Continued*) No. Page

**Gibb Welding Machines Co.,**
Bay City, Mich.
Barrel-welding equipment..... 209 113
Electrode pressure meter..... 342 132

**Gisholt Machine Co.,**
Madison, Wis.
Universal turret lathe, No. 4.. 134 101

**Gleason Works,**
1000 University Ave., Rochester, N. Y.
Spiral-bevel gear generator.... 54 88
Four-spindle manufacturing gear rougher ..... 55 89
Straight-bevel-gear generator, 3-inch ..... 56 89
Spiral-gear-cutter angle-testing device ..... 65 90

**Goddard and Goddard Co., Inc.**
Detroit, Mich.
Inserted blade cutters..... 358 134

**Goss & DeLeeuw,**
New Britain, Conn.
Work-rotating chucking machine, No. 6..... 14 81

**Gould & Eberhardt,**
Newark (Irvington), N. J.
Hobbing machines, Nos. 48-HS & 48-HL..... 58 89
Hobbing machine, No. 9-H..... 59 89
Manufacturing-type shaper, 36-inch ..... 166 106

**Gray Co., G. A.,**
3611 Woodburn Ave., Cincinnati, Ohio
Rotary grinder, 108-inch..... 80 93

**Gray Hub Co.,**
Detroit, Mich.,
"Super" multiple-spindle drill-head ..... 53 88

**Greenfield Tap & Die Corporation,**
Greenfield, Mass.
High-speed internal grinder, No. 12 ..... 74 92

**Greenlee Bros. & Co.,**
Rockford, Ill.
Improved four-spindle automatic screw machine..... 12 81

## — H —

**Hall Planetary Co.,**
Fox St. & Abbotsford Ave., Philadelphia, Pa.
"Machinabilimeter" ..... 146 103

**Hammond Machinery Builders, Inc.,**
Kalamazoo, Mich.
"Ace" heavy-duty electric grinder, Type WH..... 107 97
Floorstand grinders, 6- and 8-inch ..... 102 96
Railroad-journal wedge reclaimer, Type F-B..... 251 120
Heavy-duty polishing and buffing lathe ..... 313 128
"Rite Speed" polishing and buffing lathe..... 309 128

**Hammond Manufacturing Co.,**
7808 Kinsman Rd., Cleveland, Ohio
Six-spindle, deep-hole, oil-feed drilling machine..... 39 86

**Handy Hoist Co.,**
847 W. 120th St., Chicago, Ill.
"Handy Andy" electric hoist... 301 127

**Hannifin Manufacturing Co.,**
Chicago, Ill.
Air-operated lathe chuck..... 147 103
Hydro-pneumatic broaching press for short holes..... 212 114

## — H —

(*Continued*) No. Page

Wedge-type, air-operated rivet presses, Models WV-320 and WH-250 ..... 227 116

**Harris Calorific Co.,**
Cleveland, Ohio
Multi-stage regulator for gas cylinders ..... 314 132

**Haskins Co., R. G.,**
Chicago, Ill.
High-speed flexible-shaft equipment ..... 242 119

**Haynes Stellite Co.,**
Kokomo, Ind.
"Hascrome" welding rod..... 329 130
"Hastelloy" acid-resistant alloys ..... 401 139

**Henry & Wright Manufacturing Co.,**
Hartford, Conn.
"Hi-Power" sensitive drilling machine, ¾-inch..... 28 84

**Hill Clutch Machine & Foundry Co.,**
6400 Breakwater Ave., Cleveland, Ohio
Horizontal boring machine.... 3 79

**Hisey-Wolf Machine Co.,**
Cincinnati, Ohio
"Multi-Speed" grinder..... 113 98
Dual-motor Texdrive buffer.... 310 128

**Hoefer Manufacturing Co.,**
Freeport, Ill.
High-production drilling machine, 5 to 7½-hp..... 45 87

**Holmes Engineering Co.,**
Oshkosh, Wis.
Tilted nut tapper, No. 14..... 199 112

**Hoover Steel Ball Co.,**
Ann Arbor, Mich.
Single-row annular ball bearings ..... 387 137

**Horn Device Manufacturing Co.,**
Kenmore Box 784, Akron, Ohio
Improved "Safety" bandsaws... 347 133

**Houghton & Co., E. F.,**
Philadelphia, Pa.
Absorbed oils and "Cosmolubrics" ..... 409 140

**Howell Electric Motors Co.,**
Howell, Mich.
"Red Band" single-phase motor. 267 122

**Hunter Saw & Machine Co.,**
57th & Butler Sts., Pittsburgh, Pa.
Metal cutoff saw, No. 4..... 221 115
Inserted-tooth saw..... 366 135

**Hyatt Roller Bearing Co.,**
Newark, N. J.
Single-row radial bearings..... 386 137

## — I —

**Independent Pneumatic Tool Co.,**
600 W. Jackson Boulevard, Chicago, Ill.
"Thor" rotary pneumatic drill, No. 275..... 51 88
"Thor" rotary pneumatic wrench, No. 278..... 252 120

**Index Machinery Corporation,**
49 Central Ave., Cincinnati, Ohio
"Deckel" universal tool milling machine ..... 158 105

## — I —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Ingersoll-Rand Co.,** 11 Broadway, New York, N. Y. | | |
| High-speed pneumatic chipping hammers | 246 | 120 |
| Air compressors, Type 30 | 415 | 141 |
| **International Machine Tool Co.,** Indianapolis, Ind. | | |
| "Libby-International" cross-sliding turret lathe, Type H | 133 | 101 |


## — J —


| | | |
|---|---|---|
| **Jessop & Sons, William,** 121 Varick St., New York, N. Y. | | |
| "OK" chisel and snap steel | 403 | 139 |
| "Albor" die steel | 407 | 140 |
| **Jewell Steel & Malleable Co.,** Buffalo, N. Y. | | |
| "Jewell Alloy" heat- and abrasive-resistant iron | 399 | 139 |
| **Johnston Tool Co.,** Rooms 634-5-6 Rogers Bldg., Vancouver, Canada | | |
| "Best Bet" hacksaw-type tool | 377 | 136 |


## — K —


| | | |
|---|---|---|
| **Kane & Roach, Inc.,** Syracuse, N. Y. | | |
| Roll straightener, No. 3A-18 | 250 | 120 |
| **Kant Slip Plier & Tool Co.,** 6036-38 Wentworth Ave., Chicago, Ill. | | |
| "Kant Slip" plier | 379 | 136 |
| **Kearney & Trecker Corporation,** Milwaukee, Wis. | | |
| Bridge-type vertical "Mil-Waukee-Mil" | 156 | 104 |
| **Kent Machine Co.,** Cuyahoga Falls, Ohio | | |
| Multiple-spindle horizontal drilling machine | 36 | 85 |
| **Kent-Owens Machine Co.,** 958 Wall St., Toledo, Ohio | | |
| High-production milling machine | 151 | 103 |
| Power-feed milling machine, No. 2 | 152 | 104 |
| **Keystone Lubricating Co.,** 21st., Fairfield & Lippincott Sts., Philadelphia, Pa. | | |
| "Pneuma-Lectric" lubricating system | 424 | 142 |
| **Kimball Co., W. W.,** Kimball Building, Chicago, Ill. | | |
| "Lehigh" drawing desk | 417 | 141 |


## — L —


| | | |
|---|---|---|
| **Laidlaw, Inc., William** Belmont, N. Y. | | |
| Metal-cutting bandsaw, Type C.M.T. | 210 | 114 |
| **Landis Machine Co.,** Waynesboro, Pa. | | |
| Automatic bolt-forming and threading machine | 237 | 118 |
| **Landis Tool Co.,** Waynesboro, Pa. | | |
| Plain hydraulic grinder, 6-inch, Type C | 68 | 91 |
| Semi-automatic hydraulic cam grinder, 5x40-inch | 81 | 93 |
| Semi-automatic, hydraulic, ball-race grinder, 5-inch | 84 | 93 |


## — L —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Lees-Bradner Co.,** Cleveland, Ohio | | |
| Heavy-duty thread miller | 162 | 106 |
| Oil-well-tool threading and turning machine | 197 | 112 |
| **Lehmann Machine Co.,** Chouteau & Grand Blvd., Saint Louis, Mo. | | |
| Gear lapping machine | 63 | 90 |
| **Lewis-Shepard Co.,** 117 Walnut St., Watertown Station, Boston, Mass. | | |
| "Footlift" lift truck | 299 | 127 |
| **Lincoln Electric Co.,** Coit Rd. & Kirby Ave., P. O. Box 683, Cleveland, Ohio | | |
| Improved "Stable Arc" welders | 323 | 130 |
| Gas-engine driven welder | 324 | 130 |
| Idling device for "Stable Arc" welder | 328 | 130 |
| "New Kathode" welding electrode | 330 | 131 |
| **Linley Bros. Co.,** 581 Fairfield Ave., Bridgeport, Conn. | | |
| Rotary rivet spinning machine, No. 30-D | 230 | 117 |
| **Lodge & Shipley Machine Tool Co.,** Cincinnati, Ohio | | |
| Selective-head engine lathe, 14-inch | 126 | 99 |
| **Logansport Machine Co.,** Logansport, Ind. | | |
| "Logan" self-adjusting, non-rotating air cylinders | 392 | 138 |
| **Lucas Machine Tool Co.,** Cleveland, Ohio | | |
| Horizontal boring machine, Model 41 | 1 | 79 |
| **Ludlum Steel Co.,** Watervliet, N. Y. | | |
| "Strauss" tungsten-carbide cutting metal | 371 | 136 |


## — M —


| | | |
|---|---|---|
| **Maco Template Engineering Co., Ltd.,** 19 Cursitor St., London E. C. 4, England | | |
| "Pyroversum" optical pyrometer | 296 | 126 |
| **Manning, Maxwell & Moore, Inc.,** Pershing Sq. Bldg., 100 E. 42nd St., New York, N. Y. | | |
| Rotary continuous milling machine, No. 72 | 161 | 106 |
| Unit milling head, 4½-inch | 163 | 106 |
| Rotary gang-slitting machine, Type K | 190 | 110 |
| **Manufacturers' Consulting Engineers,** 487 S. Salina St., Syracuse, N. Y. | | |
| Centrifugal babbitting machines, "M.C.E." | 234 | 118 |
| **Micro Machine Co.,** Bettendorf, Iowa | | |
| Cylinder grinder, Model J. G. | 86 | 94 |
| **Micromatic Hone Corporation,** 1202 Maccabees Bldg., Detroit, Mich. | | |
| Hone, "Micromatic" | 378 | 136 |
| **Milburn Co., Alexander,** 1416-1428 W. Baltimore St., Baltimore, Md. | | |
| Portable acetylene generator | 339 | 131 |


## — M —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Millers Falls Co.,** Millers Falls, Mass. | | |
| Electric bench grinder | 104 | 96 |
| **Milne & Co., A.,** 745 Washington St., New York, N. Y. | | |
| "Swedelec" high-permeability iron | 397 | 139 |
| **Minster Machine Co.,** Minster, Ohio. | | |
| Tryout press | 185 | 110 |
| **Modern Machine Corporation** 285-287 N. 6th St., Brooklyn, N. Y. | | |
| "Alive" ball-bearing center | 148 | 103 |
| **Moline Tool Co.,** Moline, Ill. | | |
| "Hole Hog" cylinder borer, No. 14 | 8 | 80 |
| **Monarch Machine Tool Co.,** Sidney, Ohio | | |
| Hydraulic automatic lathe | 124 | 99 |
| **Morris Machine Tool Co.,** Cincinnati, Ohio | | |
| "Mor-Speed" radial drilling machines, 11- and 13-inch | 32 | 85 |
| **Morse Twist Drill & Machine Co.,** New Bedford, Mass. | | |
| Diemakers' reamers, No. 678 | 363 | 135 |
| **Morton Manufacturing Co.,** East Broadway & Hoyt St., Muskegon Heights, Mich. | | |
| Variable-speed transmission | 171 | 107 |
| Direct-connected reversing drive unit | 172 | 107 |


## — N —


| | | |
|---|---|---|
| **National Automatic Tool Co.,** Richmond, Ind. | | |
| "Natco" multiple-spindle drilling machine, Model D-13-H | 21 | 82 |
| "Natco" multiple-spindle drilling machine, Model C5 | 22 | 83 |
| **National Machine Tool Co.,** Racine, Wis. | | |
| "Make-Shur" thread button set | 428 | 142 |
| **National Tool Engineering Co.,** P. O. Box 712, Indianapolis, Ind. | | |
| Draftsman's pen-filling inkstand | 420 | 141 |
| **National Twist Drill & Tool Co.,** Detroit, Mich. | | |
| Wall chart of drill and tap sizes | 430 | 142 |
| **New Departure Manufacturing Co.,** Bristol, Conn. | | |
| Double-row ball bearings and applications | 388 | 138 |
| "N-D-Seal," single-row, self-lubricated, ball bearings | 389 | 138 |
| **Niagara Machine & Tool Works,** 637-697 Northland Ave., Buffalo, N. Y. | | |
| Single-crank power presses, Nos. 54 and 56 | 175 | 108 |
| Heavy-duty mill squaring shears, No. 14-M | 193 | 111 |
| Electric combination machine, No. 172 | 243 | 119 |
| **Noble & Westbrook Manufacturing Co.,** Hartford, Conn. | | |
| Power-driven marking machine, No. 15 | 219 | 115 |
| General-purpose marking machine, No. 4 | 220 | 115 |
| Rotary graduating machine, No. 41 | 244 | 119 |

## — N —


(*Continued*) No. Page

**Norton Co.,**
Worcester, Mass.
Cylindrical grinding machine with hydraulic table-traverse, 10 x 50-inch, Type BA..... 69 91
Cylindrical grinding machine, Type A 10-inch..... 70 91
Double-head, hydraulic crankpin grinding machines, 17 x 30- to 17 x 36-inch, Model 84..... 82 93
Crankshaft lapping machine, Type 50.....100 96


## — O —


**Oesterlein Machine Co.,**
Cincinnati, Ohio
"Mil-O-Matic" milling machine, No. 36.....153 104

**Ohio Gear Co.,**
1333 E. 179th St., Cleveland, Ohio
Double-reduction speed reducers 317 129

**Ohio Machine Tool Co.,**
Kenton, Ohio
"Super-dreadnaught" shaper...164 106

**O. K. Tool Co., Inc.,**
Shelton, Conn.
Offset side-lock toolholders.....145 103
Cutter blade holders.....356 134
Extra-heavy-duty face-milling cutters .....359 134

**Oliver Instrument Co.,**
Adrian, Mich.
"Arc" face-mill grinder, No. 2.. 90 94
Tap grinder..... 91 95
Drill grinder, No. 21..... 92 95
Heavy-duty die-making machine 240 118

**Oliver Machinery Co.,**
Grand Rapids, Mich.
Bandsaw, No. 192.....348 133

**Oster Manufacturing Co.,**
Cleveland, Ohio
"Leader" die stock.....381 137

**Oxweld Acetylene Co.,**
30 E. 42nd St., New York, N. Y.
High-strength bronze welding rod, No. 21.....334 131
Acetylene generator trucks, Type CLF-2 .....341 132
"Prest-O-Weld" two-stage regulator, Type R-109.....343 132


## — P —


**Paasche Airbrush Co.,**
1909-1923 Diversey Parkway, Chicago, Ill.
Paint removing machine.....306 127
"Explosion Proof" ventilating unit, Type F532.....307 128

**Pease Co., C. F.**
813-821 N. Franklin St., Chicago, Ill.
"Peerless," blue-printing machine, Model 30.....236 118

**Peerless Machine Co.,**
1615 Racine St., Racine, Wis.
Vertical heavy-duty metal sawing machine.....224 116

**Pels & Co., Inc., Henry,**
90 West St., New York, N. Y.
Regulated-pressure eccentric press .....176 108

**Pittsburgh Instrument & Machine Co.,**
1026 Reedsdale St., Pittsburgh,, Pa.
Direct-reading, Brinell hardness testing machine.....258 121

**Pollard Brothers Manufacturing Co.,**
4043 N. Tripp Ave., Chicago, Ill.
Welded die and tool truck.....429 142

**Porter-Cable Machine Co.,**
Syracuse, N. Y.
"Carbo-Lathe," 12 x 18-inch...125 99
"Speedmatic" portable electric saw, Type K-8.....351 133
"Take-About" sander, Type B-8 .....355 134

**Pratt & Whitney Co.,**
Hartford, Conn.
Jig boring machines, Nos. 3 and 3A ..... 6 79
Six-station vertical automatic, No. 2..... 15 81
Six-spindle, vertical, deep-hole drilling machine ..... 18 82

**Production Machinery Sales Co.,**
4845 St. Aubin Ave., Detroit, Mich.
Vertical chucking machine..... 13 81

**Producto Machine Co.,**
Bridgeport, Conn.
Double-spindle cam milling machine, No. 11 D.....160 105

**Putnam Machine Works,**
Fitchburg, Mass.
Rotary, continuous milling machine, 72-inch .....161 106
Unit milling head, 4½-inch.....163 106
Rotary, gang-slitting machine, Type K .....190 110


## — R —


**Ray Machine Co.,**
5403 West Lake St., Chicago, Ill.
Electric screw driving machine, Type CSB-B .....233 117

**Ready Tool Co.,**
Bridgeport, Conn.
Ball bearing live center.....150 103

**Reed-Prentice Corporation,**
Worcester, Mass.
Jig boring and vertical milling machine, No. 5..... 5 79
Indicating devices for the No. 5 jig borer ..... 7 80

**Reid-Avery Co., Inc.,**
21st St. & Washington Ave., Philadelphia, Pa.
"Raco" packaged welding rod..335 131

**Revolvator Co.,**
336-352 Garfield Ave., Jersey City, N. J.
"Red Giant" portable elevator..300 127

**Reynolds Electric Co.,**
2650 W. Congress St., Chicago, Ill.
"Reco" control device.....274 128
Motor with built in switch, Type "C" .....270 128

**Rickert-Shafer Co.,**
Erie, Pa.
Semi-automatic tapping machine.196 111

**Robbins & Myers, Inc.,**
Springfield, Ohio
Differential chain hoist.....302 127

**Rockford Iron Works,**
Rockford, Ill.
Double-crank press, No. 5.....179 109
Crank presses, "New Rockford".180 109
Eccentric presses .....181 109
Adjustable bed press, No. 24R..183 109
Knuckle-joint embossing press, 250-ton .....184 109
Drawing roll .....241 119

**Rockford Machine Tool Co.,**
Rockford, Ill.
Hydraulic shaper-planer .....167 107

**Rockwell Co., Stanley P.,**
296 Homestead Ave., Hartford, Conn.
Quenching tank agitator.....295 125

**Rockwell Co., W. S.,**
50 Church St., New York, N. Y.
Inclosed-front, heat-treating and carburizing furnaces .....288 125

**Root Co., B. M.,**
Sherman St., Nr. Prospect St., York, Pa.
Reel borer, Style "AMR".....345 132
Borers, Style "GM".....346 132

**Ross Operating Valve Co.,**
6488 Epworth Blvd., Detroit, Mich.
Improved operating valve.....395 138

**Rotary File Co.,**
14063 Welland Ave., Detroit, Mich.
"Profilo" rotary files.....376 136

**Rotor Air Tool Co.,**
Cleveland, Ohio
Drills, Types E-4-C and E-40-C 49 88
High-production drill, Type E-O 50 88
"Rotor" die grinder..... 89 94
Standard and high production grinders, Type D-O.....114 98

**Rustless Iron Corporation of America,**
122 E. 42nd St., New York, N. Y.
Chrome-iron alloys .....398 139

**Ryerson & Son, Inc., Jos. T.,**
Chicago, Ill.
Combination shear, punch, and coper, No. 7.....191 111
Flue roller for 1½- to 6-inch tubes .....217 117
Flue cutting and polishing machines .....218 115
Work-rotating attachment for No. O high speed friction saw.226 116
Saw blades for the No. O cut-off machine .....367 135
Cold-finished, high-manganese screw stock .....402 139


## — S —


**Safety Grinding Wheel & Machine Co.,**
Springfield, Ohio
"Rite Speed" heavy-duty grinder.108 97
"200 Series" swing-frame grinders .....115 98

**St. Paul Welding & Manufacturing Co.,**
174 West Third St., St. Paul, Minn.
"Torit" kerosene burner, Type 8-K .....338 131

**Scovil, Inc., D. & H.,**
Higganum, Conn.
Polishing-wheel resurfacing machine .....315 129

**Schauer Machine Co.,**
Cincinnati, Ohio
Bench grinder, 1 hp.....103 96

**Sellers & Co., Inc., W.,**
1800 Hamilton St., Philadelphia, Pa.
Hob and cutter grinder, No. 1.. 94 95
Planer-type milling machine, 74-inch .....157 105

**Seneca Falls Machine Co.,**
Seneca Falls, N. Y.
Automatic feeding device for Model U "Lo-Swing" automatic lathe .....144 103

**Sidney Machine Tool Co.,**
Sidney, Ohio
"Tritrol" engine lathes, 14- to 24-inch .....127 100

**Siewek Tool Co.,**
10232 Woodward Ave., Detroit, Mich.
Fixture lock .....419 141

## — S —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Simonds Saw & Steel Co.,** 127-129 S. Green St., Chicago, Ill. | | |
| High-cobalt toolbit | 368 | 135 |
| "Red Streak" high-speed-steel hacksaw blades | 418 | 141 |
| **Simplex Manufacturing Co.,** 231 Howard St., Spokane, Wash. | | |
| "Multimechanic" multiple-operations machine | 137 | 102 |
| **Simplex Tool Co.,** Woonsocket, R. I. | | |
| Pipe vise | 373 | 136 |
| Swivel backjaw vise | 374 | 136 |
| **Skilsaw, Inc.** 3814 Ravenswood Ave., Chicago, Ill. | | |
| Heavy-duty electric saw, Model R | 353 | 134 |
| **Smith & Sons, Inc., David H.,** Brooklyn, N. Y. | | |
| Bar and billet shears, Model 76 | 192 | 111 |
| Cold bending machine | 235 | 118 |
| **South Bend Lathe Works,** 426 E. Madison St., South Bend, Ind. | | |
| "New Model" Regular and Junior lathes, 9-inch | 131 | 100 |
| "New Model" toolroom precision lathe | 136 | 101 |
| **Speedway Manufacturing Co.,** 5 Great Jones St., 3rd St., East of Broadway, New York, N. Y. | | |
| Drill, ½-inch, Type 59 | 47 | 87 |
| **Springfield Machine Tool Co.,** Springfield, Ohio | | |
| High-speed, geared-head, engine lathes, 14- to 26-inch | 128 | 100 |
| **Square D Co., Industrial Controller Division,** Milwaukee, Wis. | | |
| Combination starter | 276 | 124 |
| **Standard Electrical Tool Co.,** 1938 West Eighth St., Cincinnati, Ohio | | |
| Combination grinder | 111 | 97 |
| "Rite Speed" two-motor buffer and polisher | 308 | 128 |
| **Starret Co., L. S.,** Athol, Mass. | | |
| "Junior" cylinder gage | 261 | 122 |
| **Stevens, Inc., Frederick B.,** Larned & 3rd Sts., Detroit, Mich. | | |
| "Mitchell" motor-driven polishing lathe, No. 17 | 314 | 129 |
| **Strand & Co., N. A.,** 5001 N. Lincoln Ave., Chicago, Ill. | | |
| Power screw-driver and nut setter | 232 | 117 |
| **Stuart & Co., D. A.,** 2733 S. Troy St., Chicago, Ill. | | |
| "Drawsol" deep-drawing compound | 416 | 141 |
| **Sundstrand Machine Tool Co.,** Rockford, Ill. | | |
| "Stub" brake-drum lathe | 138 | 102 |
| **Suter, Alfred,** 200 Fifth Ave., New York, N. Y. | | |
| "Krupp-Losenhausen" static and dynamic balancing machines | 254 | 121 |
| "Losenhausen" static unbalance testing machine, Type S.K.I. | 255 | 121 |
| "Losenhausen" device for measuring pressure on turning tools | 256 | 121 |
| "Losenhausen" portable ball-testing apparatus | 257 | 121 |


## — T —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Taft-Peirce Manufacturing Co.,** Woonsocket, R. I. | | |
| Field discharge switch for magnetic chucks | 284 | 125 |
| **Thomas Spacing Machine Co.,** Pittsburgh, Pa. | | |
| Multiple drilling machine | 40 | 86 |
| **Thomson Electric Welding Co.,** Lynn, Mass. | | |
| Motor-driven butt welder, No. 12 | 205 | 113 |
| Spot welder, Series 180 | 206 | 113 |
| Heavy-duty, power-driven, vertical welder, Model 290 | 207 | 113 |
| Heavy-duty, double-roller, seam welder, Model 375 | 208 | 113 |
| **Titan Tool Co.,** Erie, Pa. | | |
| Quick-release stud setter | 361 | 135 |
| **Trent Co., Harold E.,** 439-43 N. 12th St., Philadelphia, Pa. | | |
| Electrically-heated molding platens | 425 | 142 |
| Tinning pot | 426 | 142 |
| **Tubular Rivet & Stud Co.,** 87 Lincoln St., Boston, Mass. | | |
| Automatic rivet-setting machines | 229 | 117 |
| **Tuthill Pump Co.,** 131 W. 63rd St., Chicago, Ill. | | |
| Lubricant pumps, Models MS, RS, and CS | 393 | 138 |
| High-pressure oil pumps, Model H | 394 | 138 |
| **Twin Disc Clutch Co.,** Racine, Wis. | | |
| Multiple-disk machine tool clutch, Type C.C. | 320 | 129 |


## — U —


| | No. | Page |
|---|---|---|
| **Una Welding & Bonding Co.,** Cleveland, Ohio | | |
| Welding rod for dies, No. 76 | 331 | 131 |
| High-tensile welding rod, No. 65 | 332 | 131 |
| **Union Manufacturing Co.,** New Britain, Conn. | | |
| Electric-power-operated chucks, 10 to 22-inch | 143 | 102 |
| **U. S. Electrical Manufacturing Co.,** Los Angeles, Calif. | | |
| "Uniclosed" motor | 268 | 125 |
| **United Machine Tool Corporation,** 75 West St., New York, N. Y. | | |
| "Braun" radial drilling machine | 33 | 85 |
| "Braun" radial drilling and tapping machines, Type SRB | 34 | 85 |
| "L. M. G." electro-mechanical riveting machines | 228 | 116 |
| **U. S. Electrical Tool Co.,** Cincinnati, Ohio | | |
| Grinder with Gibbs V-disk transmission | 112 | 97 |
| Multi-speed buffer and polisher | 311 | 127 |
| **Universal Boring Machine Co.,** Hudson, Mass. | | |
| Tri-way horizontal boring machine, No. 40 | 2 | 79 |


## — V —


| | No. | Page |
|---|---|---|
| **Vanadium-Alloys Steel Co.,** Latrobe, Pa. | | |
| "Vasco Colhed" cold-heading die steel | 404 | 139 |
| **Van Dorn Electrical Tool Co.,** Cleveland, Ohio | | |
| "Flex Disc" grinder, 7-inch | 109 | 97 |
| Bench grinder, 7-inch | 110 | 97 |
| **Van Norman Machine Tool Co.,** Springfield, Mass. | | |
| Oscillating grinders, No. 25 | 83 | 93 |


## — W —

(*Continued*)


| | No. | Page |
|---|---|---|
| **Wadsworth Core Machine & Equipment Co.,** Akron, Ohio | | |
| Core cutting and coning machine, No. 1 | 215 | 114 |
| Core making machine, No. 1 | 216 | 115 |
| **Walker Co., Inc., O. S.,** Worcester, Mass. | | |
| Single-stroke surface grinding machine, Model D | 77 | 92 |
| **Wallace & Co., J. D.,** 134-158 S. California Ave., Chicago, Ill. | | |
| "Workace" electric shaper for pattern shops | 354 | 134 |
| **Warner & Swasey Co.,** Cleveland, Ohio | | |
| Universal turret lathe, No. 5-A | 132 | 101 |
| Universal turret lathe, No. 5 | 135 | 101 |
| **Western Machine Tool Works,** Holland, Mich. | | |
| "Garvin" Timkenized speedbox for the No. 1 automatic tapping machine | 52 | 88 |
| **Westinghouse Electric & Manufacturing Co.,** E. Pittsburgh, Pa. | | |
| Reversing drum controller, Type A | 273 | 128 |
| Dust-tight linestarter | 277 | 124 |
| "Weldomatic" welding outfit | 325 | 130 |
| Dual-drive welding unit | 326 | 130 |
| "Sharples" combination super-centrifuge and filter press oil purifier | 414 | 140 |
| **Whirlwind Products Co.,** 1737 Ludlow St., Indianapolis, Ind. | | |
| Horizontal bench-type drilling machine | 37 | 86 |
| **Whiting Corporation,** Harvey (Chicago Suburb), Ill. | | |
| Electric locomotive mover | 423 | 142 |
| **Whitney Metal Tool Co.,** Rockford, Ill. | | |
| Punch and notcher, No. 17 and No. 49 | 195 | 111 |
| T-Iron bench legs and benches | 413 | 140 |
| **Wiedemann Machine Co.,** 1815-31 Sedgley Ave., Philadelphia, Pa. | | |
| "Eda" multiple punch | 194 | 111 |
| **Wiesman Manufacturing Co.,** 4th & St. Clair Sts., Dayton, Ohio | | |
| Improved safety guards for punch presses | 186 | 110 |
| **Williams, White & Co.,** Moline, Ill. | | |
| Improved punch presses | 174 | 108 |
| **Wilson-Maeulen Co., Inc.,** 383 Concord Ave., New York, N. Y. | | |
| Potentiometer-type recording pyrometer, Model 8201 | 297 | 126 |
| **Wise Manufacturing Co.,** Eighth & Carlton Sts., Berkeley, Calif. | | |
| Multi-speed transmissions | 318 | 129 |
| **Wodack Electric Tool Corporation,** 4627 W. Huron St., Chicago, Ill. | | |
| Electric drill, ¼-inch | 46 | 87 |
| Electric handsaw, Model "K" | 352 | 133 |


## — Y —


| | No. | Page |
|---|---|---|
| **Young Brothers Co.** Detroit, Mich. | | |
| Coke-fired core oven heater | 293 | 126 |

# CONTENTS OF THE REVIEW PAGES

**European Edition**


| | No. | Page |
|---|---|---|
| **Boring and Turning Machines** | **1-3** | **149** |
| **Drilling Machines** | **4-15** | **150** |
| Horizontal | 4-7 | 150 |
| Radial | 8-9 | 151 |
| Sensitive | 10 | 151 |
| Vertical | 11-15 | 151 |
| **Grinding Machines** | **16-26** | **152** |
| Cylindrical | 16-17 | 152 |
| Surface | 18-20 | 153 |
| Thread | 21 | 153 |
| Tool | 22-24 | 153 |
| Special-purpose | 25-26 | 154 |
| **Lathes** | **27-37** | **154** |
| Engine | 27-31 | 154 |
| Surfacing and boring | 32-33 | 155 |
| Turret | 34-35 | 155 |
| Wheel and axle | 36-37 | 156 |
| **Milling Machines** | **38-45** | **156** |
| Duplex | 38-39 | 156 |
| Manufacturing | 40 | 157 |
| Plain | 41-42 | 157 |
| Slot | 43 | 157 |
| Miscellaneous | 44-45 | 157 |
| **Planers and Shapers** | **46-51** | **158** |
| Planers | 46-49 | 158 |
| Shapers | 50-51 | 159 |
| **Presses** | **52-54** | **159** |
| Eccentric | 52 | 159 |
| Straightening | 53-54 | 159 |
| **Punching and Shearing Machines** | **55-60** | **159** |
| **Other Machines** | **61-75** | **160** |
| Bending | 61 | 160 |
| Cutting, shape | 62-63 | 161 |
| Filing | 64-65 | 161 |
| Hammer, drop | 66 | 161 |
| Hobbing | 67 | 161 |
| Riveting | 68 | 161 |
| Tapping | 69-70 | 162 |
| Miscellaneous | 71-75 | 162 |
| **Testing Equipment** | **76-79** | **163** |
| **Transmission Equipment** | **80-91** | **164** |
| Speed changers | 80-83 | 164 |
| Speed reducers | 84-85 | 164 |
| Miscellaneous | 86-91 | 164 |
| **Miscellaneous Equipment and Supplies** | **92-104** | **165** |
| Furnaces and pyrometers | 92-94 | 165 |
| Small tools | 95-97 | 166 |
| General | 98-104 | 166 |


## *Boring and Turning Machines*

— 1 —

### Boring Machine, Horizontal, 4-Inch Spindle

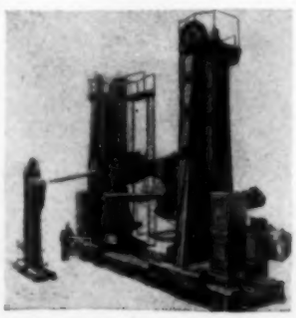
*Hulse & Co., Ltd., Manchester, England.* [Vol.71,p. 180E]

Drilling, boring, tapping, studding, and milling can be done on this 4-in. spindle, motor-driven, horizontal machine, which has a bed 13 ft. 3 in. long. It is fitted with a non-rotating screw for milling and quick power traverses, and facings at the front are provided for bolting to a large worktable.

The upright frame has hand and self-acting motion for milling and quick power horizontal traverse of 10 ft. along the bed. The spindle slide has hand and self-acting motion for milling and quick power traverse up and down.

The distance from the spindle to the worktable is 1 ft. 9 in. minimum, and 8 ft. 9 in. maximum. It is bored No. 5 Morse taper and has variable, positive, self-acting and hand feed motions for drilling and boring, also quick hand traverse and fine hand adjustment for setting the tools. The spindle has a horizontal traverse in each direction of 2 ft. 3 in., and up to 4 ft. 6 in. with a shift in the clamping means.

The spindle slide is driven by a 15-hp., constant-speed, reversible motor through sixteen changes of gearing, affording a range of from 5 to 300 rev. per minute. Six drilling and boring feeds to the spindle, ranging from 0.25 to 0.008 in. per revolution of spindle, are provided through sliding gears. The milling feeds vary from 1 to 6 in. per minute.



— 2 —

### Boring Machine, Turbine

*Campbells & Hunter, Ltd., Leeds, England.* [Vol.71,p.33E]

The bedplate is 39 ft. 6 in. long by 15 in. deep and is made in two sections. The driving headstock is mounted on a substantial raising block and the steel spindle is carried in a long cast-iron sleeve revolving in adjustable gunmetal bearings. A feed motion of 6 ft. is applied to the spindle by screw, six variations of reversible power feed being available, and the hand feed motion is fitted with micrometer adjustment. Drive is by a 20 hp., variable-speed motor, the spindle speeds ranging from 100 down to 0.5 r.p.m.

Speeds and feeds are controlled by levers in the front of the headstock.

Two worktables, each 10 ft. by 6 ft. 6 in., are adjustable along the bed by rack and pinion. Two stays are also provided for supporting the boring bars. From the center of the spindle to the top of the tables is 6 ft. 6 in. or 4 ft. with the packing pieces removed. The maximum distance between the two stay bearings is 28 feet. Weight, 32 tons.

— 3 —

### Screw Machine, Automatic, Six-Spindle

*A. C. Wickman, Ltd., Coventry, England.* [Vol.70,p.232E]

This Schutte six-spindle automatic can be used for producing duplicate parts from the bar as a six-spindle full-automatic or as a six-spindle semi-automatic

for machining castings, forgings, and stampings in one or more operations. It may also be employed as a double three-spindle automatic for the rapid production of parts of plain shape.

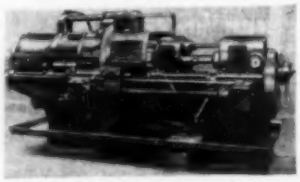
The drive is by 28-hp. motor. A gearbox at one end provides all the motions. All speed changes are obtained by pick-off gears. The direction of rotation of the spindle is counterclockwise, permitting the use of standard drills and reamers.

The drive for the six rotating tool spindles in the tool carriage is taken also from the gearbox. All longitudinal tool feeds are obtained through a rotary motion and screw. The only cams employed are for cross feeding and for the automatic bar feed. Six independent cross-feeding tools are available and are located around the chuck drum.

The main tool carriage has twelve tools, six in the rotating spindles in line with the chucks and six on a center block of hexagon form which is fixed to the main slide and carries end-machining tools. For such operations as reaming and high-speed drilling, subsidiary motions are supplied to each tool independently as required.

The mechanism for the automatic bar feed is duplicated for working either on one or two per cycle. A magazine attachment for feeding can be provided.

Three sizes of the full-auto-



matic bar machine are built. The first two sizes can also be used as semi-automatic chucking machines. The machine illustrated has a bar capacity of 1⅝ in., a maximum travel of the main toolslide of 7 1/16 in., and a maximum length of bar feed of 7¼ in. Whitworth threads up to ¾ in. can be cut. The spindle speeds range from 120 to 1,250 r.p.m. and the eleven automatic tool feeds range from 0.003 to 0.037 in. per spindle revolution.

Weight, 17,000 pounds.

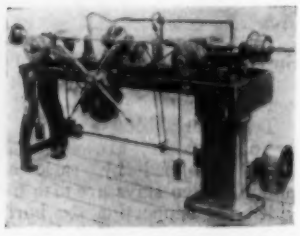
# *Drilling Machines*

## — 4 —

### Drilling Machine, Horizontal, Two-Spindle

*Jones & Shipman, Ltd., Leicester, England.* [Vol.70,p.257E]

The two-spindle, horizontal drilling machine is intended for long holes that have to be drilled from both ends of the work simultaneously. Generally speaking, the machine is similar to that previously made by the



firm, the two spindles being worked simultaneously by the hand lever and chain on the front; but in this instance, a revolving vise holds the work and has a split collet on each end of the spindle to insure rigidity. Two hardened steel guide bushings are also fitted, coming close up to the collets.

To insure an adequate supply of lubricant to the drills, a flexible tube is carried through the guide brackets into the guide bushings. The speeds of the two spindles differ, the one running in the same direction as the job being the faster, thus giving equal cutting speeds to both drills. The revolving vise is hinged to enable it to be swung clear for the easy removal of the job.

The maximum distance between the chucks on the machine shown is 30 in. The maximum feed to each spindle is 7 in., with cam trip is adjustable anywhere up to that feed.

## — 5 —

### Drilling Machine, Horizontal, 4-Inch Spindle

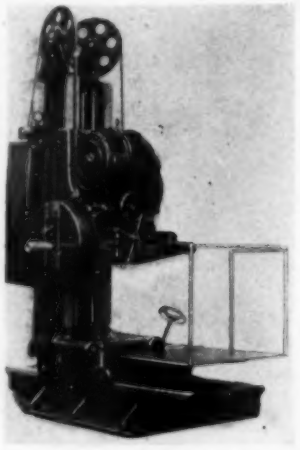
*W. Asquith, Ltd., Halifax, England.* [Vol.70,p.279E]

For facing, boring, drilling, and tapping the seats of boiler mountings on their drums, the 4-in. spindle drill has been developed. The machine is arranged for mounting on a large square table which moves along a bed about 60 ft. long. The table and bed, together with the necessary traversing gear, are supplied by the client. The underside of the bed is provided with a circular facing to suit mounting arrangements.

Maximum height from spindle to floor, 7 ft. 2 in., minimum height, 4 ft. 2 in. The column is mounted on a traveling slide, on which it is adjustable along the traverse bed a distance of 6 ft. by hand. It has also a transverse movement of 2 ft. The saddle has a vertical adjustment of 3 ft. on the column. All controls are handily placed.

A cascade oiling system is incorporated on the slide. The spindle has a horizontal feed of 18 in., with independent feed through friction clutch, as well as hand feed. A nine-speed gearbox and treble gears give 27 speeds from 11 to 336 r.p.m., while the feeds are 30, 60, and 90 cuts per in. A reverse motion for tapping is embodied.

The facing spindle is suitable for work from 7 in. to 24 in. in diameter. Automatic feeds,



1/16 and 1/32 in., are provided for the facing cutter. The range of 27 speeds, from 3 to 90 r.p.m. is obtained from the gearbox on the slide. The drive is by a 10 hp. constant-speed motor.

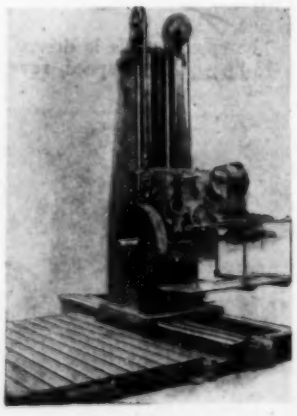
Floor space, 15 ft. by 7 ft. 6 in.; height, 14 ft.; weight, 12 tons.

## — 6 —

### Drilling Machine, Horizontal, Duplex

*W. Asquith, Ltd., Halifax, England.* [Vol.71,p.169E]

This electrically driven horizontal drilling, boring, tapping, and milling machine will bore up to 6 ft. in diameter in cast iron, and will take a cut to ¾ in. deep with a feed of 15 cuts per in. at a cutting speed of 25 ft. to 40 ft. per minute. It will bore up to 5 ft. diameter in annealed, homogeneous steel castings at a similar cutting speed and feed and a depth of cut of ½ in. The machine will also drill holes up to 8 in. in diameter. It will tap up to 6-in. Whitworth threads.



The bed is 31 ft. long by 6 ft. wide. It is fitted with the traverse screw and has facings at the front for securing the worktable. Both columns have quick power adjustment along the bed and fine hand adjustment. Power milling feeds are provided. The balanced spindle slides are raised and lowered by power, with fine hand adjustment. A platform is fitted to each spindle slide, and all controls are operated from this point. The left-hand spindle slide is arranged with a swiveling motion. The vertical traverse of the drillheads along the columns is 12 ft. and the maximum center-to-center distances between the two drilling spindles is 20 ft. The maximum height from centers of spindles, when in the top position (horizontal) to the underside of the bed is 18 ft., and the minimum distance, 6 feet.

The 7-in. steel spindles have self-acting feed motion adjustable by hand. The spindle traverse at the first grip is 5 ft. and at the second grip, 10 ft. The speeds range from 150 to 1½ rev. per minute.

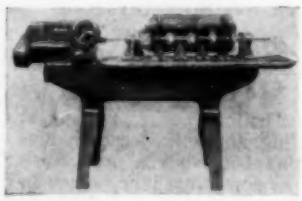
A faceplate is provided on each spindle. Fine hand feed motion to the driving faceplate provides for the adjustment of milling cutters in relation to the work. One head has a swing plate so that special feeds for large tapping can be arranged for at the same rate as the pitch of the thread. The main drive in each case is from a 25 hp., variable-speed, reversing motor mounted at the bottom of each column. All motions are controlled electrically from push buttons located on the saddles.

## — 7 —

### Reaming Machine, Line

*Alfred Herbert, Ltd., Coventry, England.* [Vol.70,p.256E]

This machine has been designed specially for line-reaming crankshaft and camshaft



bores in the crankcases of aero and automobile engines. The machine illustrated is suitable for four-cylinder engines, but a longer bed is necessary for machining crankcases for engines with six or eight cylinders. The drive is by single pulley which, running at 450 rev. per min., drives the crankshaft bore reamers at 150 rev. per min., and the camshaft bore reamers at 300 rev. per min. Thus, two bars are employed and are

driven from the spindles through a floating coupling, the crankcase being carried in a fixture mounted on the bed and the two reaming bars supported in guide bushings in that fixture.

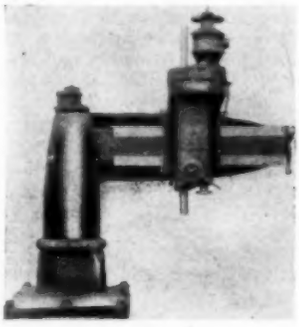
The bars and cutters are threaded through the respective bores, with one reamer for each bearing, the cutters being secured on the bars by bayonet locks. A drop-worm motion provides a feed of 0.025 in. per rev. of each spindle, the travel being 4 in. The total time needed for reaming all bores in a crankcase is 10 min., floor-to-floor.

## — 8 —

## Drilling Machine, Radial

*E. H. Jones (Machine Tools), Ltd., Islington, N., England.* [Vol.71,p.55E]

The Raboma radial drill for steel fabrication work is of a medium heavy-duty type, the distance from the center of the spindle to the outside of the column being 6 ft. 8 in., giving a maximum drilling radius of 7 ft. 10 in., and a minimum drilling radius of 2 ft. 2 in., the saddle traverse being 5 ft. 8 in.



The maximum distance from the spindle to the floor is 3 ft. 9 in. and the vertical movement of the spindle 1 ft. 10 inches.

A cylindrical column is used and on this a one-piece outside sleeve and arm swivel on ball and roller bearings. The saddle is carried on the face of the radial arm. Ball-bearing rollers support the saddle. A magnetic device controlled by push buttons on the saddle is fitted for actuating the arm lock. A further handle controls the power feed and the quick hand movement of the spindle.

The motor drive is taken by a coupling direct, and the motor may be of d.c. or a.c., three-phase type. All shafts run on ball bearings, and the gears run in an oil bath. Feed changes are obtained from sliding keys and the feeds can be changed while the machine is running. An adjustable depth stop trips the power feed at the required depth of the hole. In addition, the power feed is tripped automatically at the top and bottom limits of the spindle traverse.

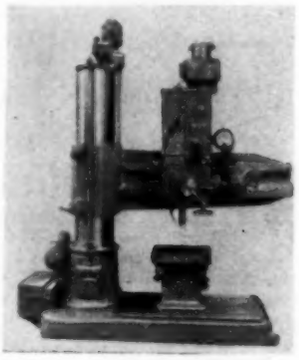
Lubrication is automatic by a pressure oil pump. A self-contained, electrically-driven pump provides coolant. If required, push-button control is available for the driving motor.

## — 9 —

## Drilling Machine, Radial, Four-Motor

*Soag Machine Tools, Ltd., Horseferry Road, London, S.W., England.* [Vol.71,p.67E]

This Kolb radial drill is equipped with four electric motors, one for drilling, one for traversing the saddle along the arm, one for raising the arm, and the last for clamping the sleeve. The motors employed are of the constant-speed type. The spindle drive gives 24 speeds from 35 to 1,535 r.p.m.,



and the 12 feeds range from 0.0047 to 0.1 in. per revolution of the spindle. The drill motor is of 7½-hp. size, the capacity of the machine being 2⅜ in. in steel of 40 tons tensile strength. Other machines are available with capacities up to 3½ in., having 36 speeds and 16 feeds.

The machine illustrated has a radius from the center of the column of 5 ft. 9 in. and the diameter of column of 18 in. The spindle is bored No. 5 Morse taper, and the tapping capacity is 3½ in. in cast iron. The drilling depth is 16 in. and the maximum distance from the base plate to the spindle is 5 ft. 11 inches.

All gearing is of hardened chrome-nickel steel, inclosed, and the shafts and the splined drilling spindle run in ball bearings. Both the speed and the feed changes are effected by sliding gears. The saddle is traversed along the arm by power or by hand, fine hand adjustment being provided. Controls have been centralized.

Weight, 4½ tons.

## — 10 —

## Drilling Machine, Sensitive, Vertical

*S. G. Jones, Ltd., Brixton Road, S.W., England.* [Vol. 70,p.228E]

This Muehlmatt portable sensitive vertical drill is available in three standard sizes. The machine will drill holes from

0.01 to ⅞ in. diam. in any material and up to ¾ in. diam. in the soft materials. In each case, the drive is by ½-hp., constant-speed motor, the speed changes being obtained by pulleys. The range covers speeds from 1,000 to 10,000 rev. per minute.

The spindle is of tool steel and has ball thrust bearings and a centrifugal oiling system at the top. Feed is by a ratchet. Positive adjustable stops are provided. The round table for the work is mounted on a universal bracket and it will take various work-holding devices. Three point support is used.

In the machine shown, the maximum distance between the base and the chuck is 8 in. and between the table and the chuck, 4 in. The distance from the center of the table to the column is 2¼ in. and the travel of the spindle, 2 inches.

Weight, machine illustrated, 52 pounds.

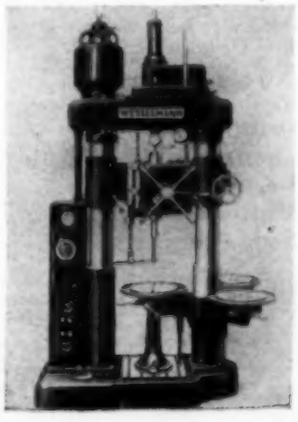
## — 11 —

## Drilling Machine, Double-Column, with Triple Table

*E. H. Jones (Machine Tools), Ltd., Islington, N., England.* [Vol.70,p.202E]

This machine, built by the Wesselmann Bohrer Co., A.G., Gera, Germany, is built in two types, the main difference being in the speed provided. One is for drilling holes up to 1 in. in diameter in steel and to 1¼ in. in cast iron, while the other is for drilling up to 1½-in. holes in soft metals.

The distance from the center



of the spindle to each column is 12 in.; maximum distance between spindle and tables, 21 in.; between spindle and baseplate, 44 in. The drilling depth is 8 in. The circular tables are 14 in. in diameter.

Drive is by a vertical-spindle, d.c. motor mounted at the top, providing 10 spindle speeds. The speed is controlled by a starter. The range is from 400 to 1,200 r.p.m., on the first machine, and from 1,000 to 3,000 r.p.m. for the machine for drilling soft metals.

The feeds, controlled by hand lever, range from 0.008 in. to 0.02 in. per rev. for iron and steel and from 0.016 to 0.04 in. for the lighter metals. The columns carry the spindle headstock, which is vertically adjustable.

The three tables illustrated are employed for repetition work. Loading and the release of finished work can be carried out on two of the tables while drilling proceeds on the third.

Floor space, 6 ft. 4 in. by 2 ft. 8 in.; height, 11 ft.; weight, 3,000 pounds.

## — 12 —

## Drilling Machine, Multiple-Spindle, Hydraulic

*A. C. Wickman, Ltd., Coventry, England.* [Vol.70,p.205E]

Wanderer-Werke, A.G., Schonau-Chemnitz, Germany, has built this multi-spindle drilling machine with the addition of hydraulically operated feeds for the spindle heads. The machine is available in three different styles, having 12, 16, and 24 spindles. The main drive may be either by belt or by a motor, which should be of 10 to 20 horsepower.

For the hydraulic feed, an oil

pump is driven by chain and supplies pressure to two cylinders, which can be regulated to provide feeds from 0 to 19½ in. per minute. Adjustable stops trip the feed and reverse it to give a quick return. The spindles are driven by universal joints and variation of the speeds is obtained by means of gears, 20 changes being available.

The machine is supplied with

a circular rotary table, 33⅜ in. in diameter, and has a dividing device. While drilling proceeds, a second piece can be secured.

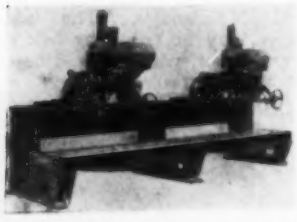
Specifications for all three machines: Spindle head center to front face of the column, 15⅜ in.; working surface of baseplate, 29½x31½ in.; maximum and minimum distances between baseplate and spindles, 16⅜ and 38½ in.; largest rectangular drilling range, 24x16 in.; circular drilling range, 15⅜ in. The 12-spindle machine has 2-in. spindles spaced at 2-in. centers, while the other two machines have spindles 1⅜ in. in diameter, spaced at 1¾-in. centers. The vertical traverse of the spindle head in all cases is 21⅜ in. Floor space, all machines, 9 ft. 6 in. x 4 ft., 11 in.; height, 4 ft. 3½ in.; weight, 6 tons.

## — 13 —

### Drilling Machine, Solebar-Pattern

*W. Asquith, Ltd., Halifax, England.* [Vol.71,p.23E]

This machine will drill holes up to 2 in. in diameter in mild steel. The traverse bed, 16 ft. long by 1 ft. 9 in. wide, has square guide ways for two independent drilling heads. A table, running the full length of the bed and measuring 2 ft. 9 in. wide, has T-slots for securing the work. The two drilling heads are traversed along the bed by hand, the maximum and minimum center-to-center distances of the two spindles being 13 ft. 3 in. and 3 ft. 9 in. The overhanging arms have machined ways for the



drill slides, which are adjustable on ball and roller bearings.

Each saddle is adjustable on its arm a distance of 2 ft. Each high-carbon steel, six-splined drilling spindle is bored to No. 5 Morse taper. The vertical feed is 14 in., the three rates being 58, 84 and 120 cuts per in. Quick vertical adjustment is obtainable.

The main drive to each spindle is through a hardened steel worm and phosphor-bronze worm wheel running in oil. Each drilling head is independently driven by a 5-hp., constant-speed motor. Six spindle speeds are available, from 85 to 400 r.p.m. The maximum distance between the spindle nose and table top and also the height from the floor to the table top is 2 ft.

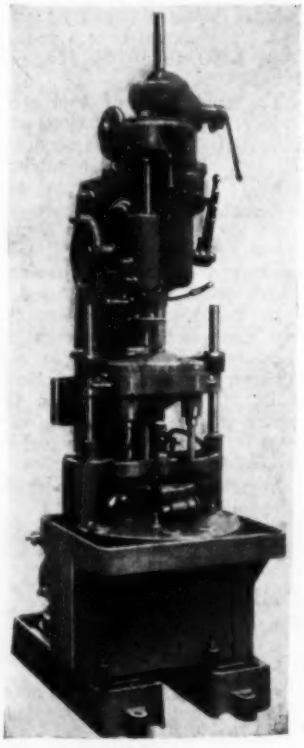
Floor space, 18 ft. long by 7 ft.; height, 8 ft. 6 in.; weight, without motors, 7¼ tons.

## — 14 —

### Drilling Machine, Vertical

*Alfred Herbert, Ltd., Coventry, England.* [Vol.71,p.29E]

This machine is fitted with a multi-spindle drillhead and an automatic indexing fixture. All spindles, including the spindle carrying the head, run at 125 r.p.m. The first spindle in the head carries a 1⅜-in. core drill, the next spindle carries a single-point cutter in a bar, while the third spindle finishes the hole with a 1⅞ in. reamer. Quite a variation in spindle speeds can be arranged. The



production obtained is one piece per 45 seconds.

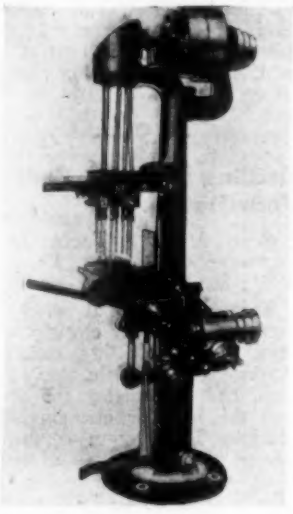
An indexing fixture is formed by the traveling vertical guide bars in the two fixed guides, the upper being bolted to the column of the machine and the lower being part of the fixed portion of the jig. As the work table is indexed, the guide bars engage automatically in the locating holes. These holes are fitted with hardened and ground steel bushings.

## — 15 —

### Drilling and Countersinking Machine, Vertical, Multiple-Spindle, Semi-Automatic

*Soag Machine Tools, Ltd., Horseferry Road, Westminster, S.W., England.* [Vol.71,p.90E]

This unit is intended for the rapid drilling and countersinking of hinges and similar articles produced in quantities. It



is available in two sizes, with from 4 to 12 spindles. They are driven through universal joints and the distance between the spindles is adjustable. Ball bearings are fitted in the unit.

The main drive is by two step-cone pulley. The table is automatically raised and lowered by depressing the pedal. If small quantities are to be dealt with, the automatic feed is not used, the table being fed by hand lever. The machine can also be adapted for automatic drilling. Combined machines can be supplied for both semi-automatic countersinking and automatic drilling.

Specifications of the smaller machine: Maximum drilling area, 6x11 in.; maximum drilling capacity, ⅜, or ⅞ in. when countersinking; spindles, 4 to 8; horizontal adjustment of spindles, 1 in.; power required, 4 hp.; net weight, 1,430 pounds.

Specifications of larger machine: Number of spindles, 4 to 12; drilling area, 8x13⅜ in.; drilling capacity, ⅝ in. or ⅛ in. when countersinking; horizontal adjustment of spindles, 1 in.; power required, 6 hp.; net weight, 1,710 pounds.

# *Grinding Machines*

## — 16 —

### Grinder, Plain, 80x12-Inch

*Selson Engineering Co., Ltd., Hatton Garden, E. C., England.* [Vol.71,p.65E]

This Naxos-Union plain grinder has a capacity of 80 in. in length by 12 in. in diameter. The large-wheeled head is claimed to be of value for plunge-cut work. The wheel may be 6½ in. wide by 20 in. in diameter. The machine is self-contained with a driving pulley at the back, and is driven either from countershaft or by a motor. All control levers are centralized.

The work table is of triangular section and the upper part can be swiveled on the lower

for taper-grinding to about 7 deg. The machine is also made with a single table for cylindrical grinding only. The table can be operated by hand or automatically, eight longitudinal feeds from 7 to 7 ft.-6 in. per min. being provided. Reverse of the table can be effected by adjustable stops within the limit of 0.001 in. The reverse can also be operated by hand.

The rapid wheel traverse can be done by hand, with fine hand adjustment. The automatic feeds range in steps from 0.0001 to 0.004 in. with automatic knock-off.

The wheel spindle is of hardened and ground chrome-nickel steel, running in adjustable phosphor-bronze bearings. Wheel speeds are 960 and 1,200 r.p.m. The grinding wheel is mounted on a flanged sleeve centered on cones.

On machines up to 10 ft. in length, the work drive is from a shaft driven through gears from a central gearbox, but on larger machines the work is driven by an additional motor mounted on top of the headstock. In each case eight speeds are provided, from 19 to 180 r.p.m., controlled by a lever. The center-grinding attachment is clamped to the bed and swivels on a graduated base. The three universal steadyrests, with maximum capacity of 4 in. diam., have jaws that can be adjusted independently. The maximum reduction of work at one setting is 0.06 in. and the machine takes up to 15 horsepower.

Floor space, 15 ft. 10 in. by 5 ft. 7 inches.

## — 17 —

### Grinder, Electric-Hydraulic, Plunge-Cut

*G. H. Alexander Machinery Ltd., Birmingham, England.* [Vol.71,p.68E]

This plunge-cut grinder built by L. Loewe & Co., Berlin, will grind 9⅜ in. diam. without rests or 5⅜ in. diam. with rests, by 19⅞ in. long. The grinding wheel used is 17⅜ in. in diam. by 7⅞ in. maximum width and rotates at 1,450 r.p.m. The machine is driven by an electric motor of about 20 hp. The

time cycle can be varied from 20 seconds to 3 minutes and the maximum cut per revolution of the workpiece is 0.0236 in. but this can be varied.

The oscillating motion of the wheel spindle is tied up to the workpiece revolutions, making it possible to grind pieces with double shoulders. The tailstock center is withdrawn hydraulically. Only hand feed with fine adjustment is provided for the wheel. An automatic wheel grinding device is available. The maximum cone ground is 1 in 4.

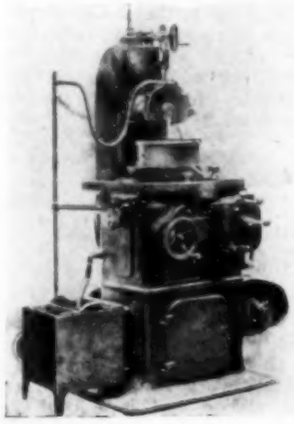
Floor space, 67 x 106½ inches.

## — 18 —

## Grinder, Surface, Horizontal, with Rotary Table

*Alfred Herbert, Ltd., Coventry, England.* [Vol.70,p. 205E]

Samsonwork, Berlin, Germany, has built this horizontal surface-grinding machine in which the table has a cross reciprocating motion, but no longitudinal traverse, and carries also a circular table that can be rotated. The rotary table is 11⅞ in. in diameter and will take a magnetic chuck of the same size, the grinding height with a new wheel being 8¼ in., or with a magnetic



chuck, 4⅜ in. Drive is by a single pulley or by 2-hp. flange motor. The circular table can be tilted 3 deg. each way and it has two speeds, namely, 60 and 120 rev. per minute.

The lower table slides in line with the axis of the grinding-wheel spindle, the motion being reversed automatically and being variable from ⅜ to 6⅞ in. The automatic feed of the grinding wheel per revolution of the table is from 0.005 to 0.03 millimeters.

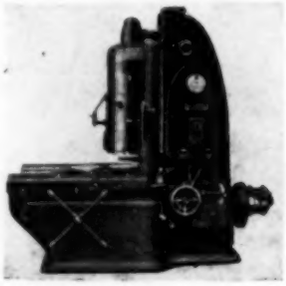
Weight, 1,375 pounds.

## — 19 —

## Grinder, Surface, Rotary

*Selson Engineering Co., Ltd., Hatton Garden, E. C., London, England.* [Vol.70,p.230E]

This Naxos-Union rotary surface-grinding machine deals with cast iron, malleable iron, hardened and mild steel, and works on a continuous produc-



tion basis. It is driven by built-in motors and the spindle carries the armature of the vertical driving motor. Either a cylindrical or segmental wheel can be employed. The revolving table carries a magnetic chuck and is itself mounted on a carriage. Six table speeds are available and no table or wheel movement is used during grinding.

The vertical grinding feed is by hand or automatically, ranging from 0.0001 in. to 0.004 in. per revolution of the table. An automatic trip will set depths of cut up to ⅜ in. The table motor also raises and lowers the grinding head. All operating handles and levers are grouped together. For wet grinding, a system of splash guards can be fitted.

The machine illustrated has a magnetic chuck capacity of 20½ in. in diameter, the horizontal range of the table being 13¾ in., and the greatest depth of work admitted, 10½ in. The table speeds range from 7½ to 40 r.p.m. Driving motors are 25 hp. for the wheel, 30 hp. for the table and grinding head movement, and ½ hp. for the centrifugal pump.

Floor space, 4 ft. 3 in. by 8 ft. 3 in.; weight, with motors, 4¼ tons.

## — 20 —

## Grinder, Surface, Rotary-Table, Heavy-Duty

*Alfred Herbert, Ltd., Coventry, England.* [Vol.70,p.244E]

The Lumsden Machine Tool Co., Ltd., of Gateshead, has built this heavy-duty surface grinder for dealing with large dies, bedplates, textile-machine frames, and motor-car cylinders. The machine has a table 84 in. in diameter, the grinding wheel being 44 in. in diameter, and the maximum diameter of the work ground, 88 in. If desired, the machine can be supplied with a wheel 50 in. in diameter and a table 100 in. in diameter.

To the bed are bolted columns which carry a bridge piece containing the grinding-

head unit. The bridge piece itself forms a housing for the cylindrical ram that carries the grinding-wheel spindle. By means of this ram, the feed motion is obtained, the motion being by rack and pinion. The automatic motion can be varied as desired, while a trip motion can be set to stop the feed. Quick hand motion is provided for raising and lowering the grinding wheel.

The grinding wheel is of segmental form, and the drive to the spindle is by a 80-hp. motor at the top. The drive to the table is by a 5-hp. motor. The table is rotated by a central ball-bearing pivot. Automatic lubrication to the table ways is provided by a rotary pump. Another pump supplies coolant.

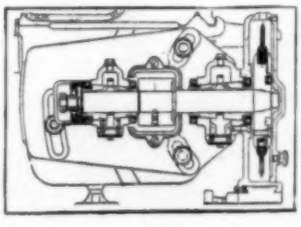
Floor space, 17 ft. by 11 ft. 8 in.; weight, without electrical equipment, 28 tons.

## — 21 —

## Grinder, Thread, Screw, Precision

*Alfred Herbert, Ltd., Coventry, England.* [Vol.71,p.156E]

On page 345E of the issue of February 2, 1929, there was published a fairly complete account of the Reishauer precision thread grinder. The work revolves and travels past a grinding wheel, which is inclined at the thread helix angle and cuts only in one direction, from left to right, the wheel then retreating from the work, which is reversed and returned. The dial indicator shows the depth of thread at each pass. The machine will grind from the solid



both right- and left-hand threads, parallel or taper, and the feed and withdrawal of the wheel are controlled hydraulically. A Zeiss microscope is provided for examining the work and the wheel-truing device is self-contained.

The grinding wheel is mounted on a sleeve, which is secured by flange plates on a taper spindle-nose. The wheel spindle runs in adjustable ring-oiled bearings, with a special thrust device.

The work is carried between centers on a reciprocating table, the work spindle being driven by a Cardan shaft and worm gearing through a gearbox giving a range of roughing and finishing speeds. A leadscrew at the end of the spindle revolves in a long nut controlled by means of a slot in a disk that can be rotated. This disk can be used to compensate for any progressive error in the leadscrew or for controlling the movement of the work to give any desired variation from the standard pitch of the leadscrew up to plus or minus 0.002 in. per inch.

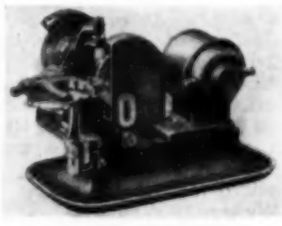
The maximum diameter ground is 1⅛ in. by 2¾ in. long, the range of pitches being from 11 to 80 per inch and the thread profile angle from 52 to 66 deg. The guaranteed accuracy on the effective diameter is plus or minus 0.0001 in., on the pitch plus or minus 0.0001 in. per in. and on the flank angle, that is the half-thread angle, plus or minus, 0 degrees, 5 minutes.

## — 22 —

## Grinder, Twist Drills

*S. G. Jones, Ltd., Brixton Road, S.W., England.* [Vol. 70,p.229E]

This Zahringer machine for grinding twist drills has a spindle that carries two wheels, one for roughing and the other for finishing, and is driven by an electric motor. A truing device for the wheels is provided.



It is claimed that the clearances necessary for drilling different materials can be ground readily. The drill is held in a special holder, two being needed for the range dealt with. The holder is carried in an oscillating cradle and sensitive hand adjustment for fine work is available. The machine is also available in a larger size arranged for wet grinding, in which case drills to 1 in. can be ground.

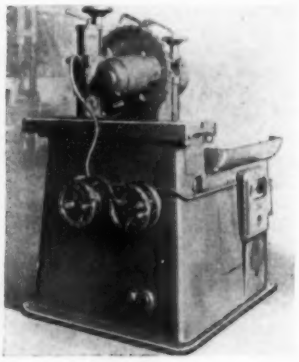
Combined with the rocking motion of the machine is a reciprocating movement to and from the center of the wheel. A further movement provides for feeding the drill evenly towards the wheel. A pointer shows the amount of feed. The drill performs the function of a setting gage.

## — 23 —

### Grinder, Cutter-Head, Automatic

*Selson Engineering Co., Ltd., Hatton Garden, London, E.C., England.* [Vol.70,p.231E]

This Collet & Engelhard cutter-head grinder will grind cutter-heads from 4 to 28 in. on the face, side, or chamfered edge, and with blades up to 3½ in. long of any number between 10 and 60. The cutter blades themselves provide means for division. A 1-hp. motor in the base provides two speeds to a



crank device, which reciprocates a rack driving a segmental wheel. In this way, part rotation, backwards and forwards, is given to the cutter-head, the forward motion being rather more than is required.

The workhead swivels and the grinding wheel, which is carried on a separate head, can swivel and tilt. Furthermore, it is adjustable vertically on a column and horizontally on its slide. It is driven at 2,900 r.p.m. by a special 1-hp. reversible motor. At each complete revolution of the work, the cutter-head itself is fed automatically towards the grinding wheel, the feed range being from 0.001 to 0.04 in. The feed can be set to stop at a predetermined distance. A pump is provided for wet grinding.

Weight, 2,866 pounds.

## — 24 —

### Grinder, Tool and Cutter, Universal

*Soag Machine Tools, Ltd., Westminster, S.W., England.* [Vol.71,p.89E]

This grinder is intended for wet and dry work and for circular grinding. It is claimed to be universal in every respect, rotary, surface, or internal grinding being undertaken with accessories.

The machine table has a working surface of 45½x7½ in., the height of centers being 4¾ in.,

and the distance between centers, 25⅜ in. The diameter swung is 9¼ in., and in the open tailstock, 2⅜ in. The table has a longitudinal movement of 25⅜ in. and a cross movement of 7¼ in., the largest diameter of the grinding wheel being 7¼ in. Spindle speeds range from 2,400 and 3,600 r.p.m., the five automatic table feeds range from 0.24 in. to 1.18 in. per second, and the four work speeds range from 40 to 115 r.p.m., or from 60 to 170 rev. per minute.

A revolving head can be clamped in any desired position. The table knee has fine adjustment and the cross-slide is hand controlled. The work spindle swivels 360 degrees.

The universal clamping device, with horizontal and vertical adjustment, is suitable for use in grinding large diameter disk and profile cutters. Jaws will take rounds up to 2½ in. Cutter heads up to 15¾ in. in diameter can be dealt with.

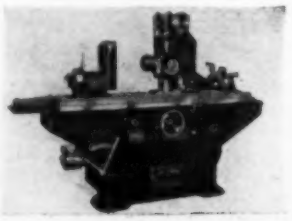
The automatic spiral and dividing head, with centers 4¾ in. high, has a geared index and automatic feed from spiral to spiral for grinding tools with spiral grooves and worm hobs up to 1.27 diametral pitch.

## — 25 —

### Grinder, Spline, Improved

*Selson Engineering Co., Ltd., Hatton Garden, E.C., London, England.* [Vol.70,p.203E]

This spline grinding machine, built by Carl Unger, Stuttgart-Hedelfingen, Germany, has been specially designed for grinding spline shafts for motor cars and machine tools. It is claimed to be suitable for grinding simultaneously all the surfaces of the groove. A wheel with the necessary profile is used and the



wheel-trueing apparatus supplied has three diamonds, one to generate the radius, and the other two the sides. Grinding can be done by other methods, however. The drive may be either by motor or by a single pulley.

The grinding head is adjustable both vertically and horizontally across the table. The tailstock is also adjustable vertically and horizontally. For long work that cannot be held between centers, a special dividing appliance is available, also with hand feed. The maximum distance taken between centers is 30 in.; the maximum grinding diameter, 4¾ in.; the grinding wheel speeds, three, and the table feeds, two. The grinding wheel may be from 2⅜ to 8 in. in diameter and ⅜ to 1⅛ in. wide.

Power required, 4 hp.; weight, 4,300 pounds.

## — 26 —

### Grinders, Crankshaft-Repair

*L. Kellenberger & Co., St. Gallen, Switzerland.* [Vol.70, p.242E]

These machines for grinding worn crankshafts of automobile and airplane engines are built in a wide range. The grinding wheel slides, not the work. The machine will swing 22½ in. and take a wheel 24 in. in diameter by 1¼ in. wide. Crankshafts may be dealt with up to 65⅜ in. between centers or, in another machine of the same type, up to 93 inches.

The worktable can swivel on a pivot so that slight tapers may be ground. A reversible automatic movement may be added to the wheel carriage. Controls have been centralized. The driving headstock carries a

gearbox which, with a two-step pulley, provides six spindle speeds, one being suitable for polishing. Two scales are available for setting the throws approximately. Counterweights for balancing purposes are fitted. Two steadyrests, one wide and one narrow, are provided, together with means for truing the wheel.

Two motors are employed, one of 3 to 4-hp., fixed at the back of the machine and driving the wheel head direct, while the other of about 2 hp. is placed in the base and drives the work. A pump is fitted.

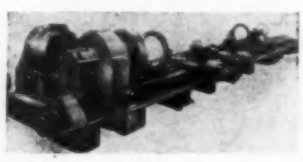
# *Lathes*

## — 27 —

### Lathe, Center, 18- and 24-Inch

*Hulse & Co., Ltd., Ordsal Works, Manchester, England.* [Vol.70,p.280E]

Both of these lathes admit 36-ft. between centers and are similar in general design. They are arranged with self-acting sliding, surfacing, screw-cutting and taper-turning motions. The main driving motor is of 30 hp., and has a speed variation of 3 to 1. It drives the spindle through heat-treated, ground



gears and a worm wheel mounted directly on the spindle. Flexible couplings are fitted between the gearbox and the worm shaft on the headstock, and flywheels have been fitted on the high-speed shafts of the gearbox and headstock.

Each lathe has been designed to give complete control of spindle speed, feed, and quick-traverse motions from the working positions at each saddle. The driving motor has a speed range of 300 to 900 r.p.m. The sliding and surfacing feeds, 0.05, 0.10, 0.15, 0.20, and 0.25 in. per revolution of the spindle, can be changed and reversed on each carriage independently.

A range of tapers from zero to 1 in 18 on the radius can be turned up to 18 ft. in length. Each carriage has an independent quick power traverse at 18 ft. per min. The stays and movable headstock can be traversed by power.

## — 28 —

### Lathe, Center Break, 12½-Inch

*Stanley Machine Tool Co., Ltd., Halifax, England.* [Vol. 71,p.45E]

This 12½-in. center break lathe admits work 20 ft. long when the sliding bed is out at its extreme position, swings work 6 ft. in diameter by 3 ft. wide in front of the faceplate when the bed is fully drawn out, and

19 in. in diameter over the saddle. The all-geared headstock with single pulley drive is mounted on a baseplate that also carries the inner end of the sliding bed, which in turn carries the saddle, compound slide-rest and loose headstock. The bed is 20 ft. long.

Eighteen spindle speeds range from 3.6 to 180 r.p.m. The steel spindle has adjustable conical bearings and an adjustable ball thrust, a 4⅞-in. hole right through admitting bars up to 4¾ in. in diameter. All headstock gears are of steel, running in oil, and steel reversing gears are fitted on the outer end of the headstock. The loose headstock sets over for taper turning. A removable pillar fitted with compound slide rest is mounted at the front.

Floor space, 7 ft. wide by 29 ft. long; weight 8½ tons.

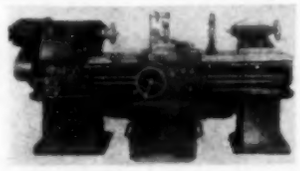
## — 29 —

### Lathe, Precision, 8-Inch

*G. H. Alexander Machinery, Ltd., Birmingham, England.* [Vol.71,p.53E]

L. Loewe & Co., Berlin, built this machine, which is made with beds of four standard lengths to take from 15¾ to 55½ between centers. The swing over the bed is 17½ in. in diameter and over the carriage about 9¾ in. in diameter. The drive may be by a flange motor of either of the a.c. or d.c. type, or by a belt and single pulley.

The twelve spindle speeds are controlled by two levers from



the front of the headstock. The machine can be started and stopped and the feeds and leadscrew operated from the apron, an interlocking device preventing conflicting movements.

A coarse-threading attachment multiplies the pitches obtained from the gearbox by ten. From the feedbox, 36 feeds longitudinal and cross can be obtained while the machine is running, but a plain-feed gearbox giving nine feeds can be substituted.

A swiveling toolholder may be provided to take four tools, and this with a fine adjustment stop, end measuring block, and a tripping mechanism.

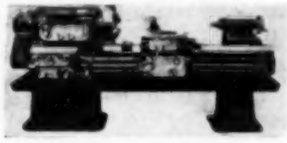
## — 30 —

### Lathe, Center, Standard

*E. H. Jones (Machine Tools), Ltd., Baldwin Terrace, Islington, N., England.* [Vol. 71, p.80E]

This standard V.D.F. lathe, with flanged motor drive, is made by the Associated German Lathe Makers. An interchangeable method of drive has been designed which permits the lathe to be driven by single pulley from a motor fixed on the floor or mounted on slide rails, or by an a.c. or d.c. motor flanged to the headstock or mounted on a bracket. According to the type of drive, 18 or 36 spindle speeds are available. For motor-drive, non-reversing motors are used and the spindle is reversed by gears in the headstock.

For starting and stopping the spindle and the engagement of



the accelerated reverse, adjustable friction clutches in the headstock are used. All sliding gears are of hardened chrome-nickel steel with rounded teeth and are mounted on six-splined shafts. Ball and taper roller bearings are used throughout. The steel spindle has a large bore and runs in bronze bearings.

Reverse of the leadscrew for cutting right- and left-hand threads is effected by tumbler gears. For the feed drive, the reversing tumbler gears in the headstock drive a Norton-type quick-change feed gear box. This drives the leadscrew and feed shaft, but the two cannot be engaged together. In the apron, provision is made for tripping both the sliding and surfacing feeds by stops fixed on the bed and saddle.

If desired, a gap bed and bridge piece may be had. The saddle and tailstock are carried on separate inverted vee guides. A taper-turning and copying attachment can be fitted.

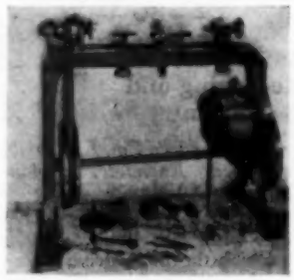
These lathes are made in two standard heights of centers, namely, 7 in. and 8 in. On the smaller machine, the maximum turning diameter over the bed is 16 in. and over the saddle, 8¾ in., the distance between the centers on the shortest bed being 2 ft. 6 in. and on the longest, 10 ft. The larger lathe will swing 17½ in. in diameter over the bed and 10 in. in diameter over the saddle. Beds are available to take from 2 ft. 6 in. to 13 ft. 4 in. between centers. For both models having 3 ft. 4 in. centers, the weights are 3,100 and 3,600 lb. respectively.

## — 31 —

### Lathe, Center, Precision, 4-Inch

*Henry Milnes, Bradford, England.* [Vol.71,p.169E]

Used for instrument manufacture and maintenance, this 4-in. center lathe has a bed 3 ft. 6 in. long and is driven by



a ½-hp. a.c. motor. The drive is transmitted by a single spur reduction gear, to a driving shaft carried between standards. The single-gear headstock has a spindle of the reversed-cone type, hardened at the necks and revolving in hardened-steel bushings. The spindle is bored through and has a nose of No. 2 Morse taper. A gunmetal division plate, with four circles of holes, and a plain spring stop are fitted to the machine for dividing purposes.

The tailstock has a spindle of the internal thread type. The compound slide-rest is graduated for conical turning. Handrests are also provided.

## — 32 —

### Lathe, Surfacing and Boring, 40-Inch

*C. Redman & Sons, Ltd., Halifax, England.* [Vol.71,p.102E]

This lathe has a bed 11 ft. 6 in. long by 24 in. across the top by 28 in. deep under the headstock. Work up to 36 in. long can be machined between the faceplate and the turret face. The headstock has three lever-controlled gear ratios, two of which drive through toggle clutch, while the third is driven by a gear behind the faceplate.

The spindle is bored to take a 4-in. bar.

With a two-speed countershaft, 24 spindle speeds are available, ranging from 420 to 4.8 r.p.m. The feeds and screw-cutting motions are driven from a gearbox mounted in the front of the machine. The feeds can be varied from 4, 8, and 16 cuts per in. to 24, 48, and 96 cuts per inch. The three feeds are changed by lever on the gearbox; they are engaged by two dropping worms placed in boxes in the apron, each interlocked with the other and also with a nut for screw-cutting. The tool turret is mounted on a graduated swiveling base 10¾ in. square. A dial thread indicator is fitted to the apron of the machine.

Floor space, 14 ft. 8 in. by 5 ft. 6 in.; weight, 6½ tons.

## — 33 —

### Lathe, Surfacing and Boring, 30-Inch

*G. Swift & Sons, Ltd., Halifax, England.* [Vol.71,p.144E]

Direct motor drive, a starter, and an ammeter are featured on this 30-in. lathe, which admits work 3 ft. long between the chuck and the front edge of the saddle. The bed is 9 ft. long by 2 ft. wide across the shears of the machine.

The all-geared headstock provides 16 spindle speeds, the steel spindle having a 3⅛-in. hole through it. A 30-in. four-jaw independent chuck is mounted on the front end of the spindle and a bar chuck at the rear end. An 8-hp., constant-speed, electric motor, mounted on a cast-iron stand off the end of the lathe, drives by a spur gear and pinion, with a friction clutch between the motor and the headstock. Thus, drive and lathe are separated.

The compound slide rest has a collar on the traverse screw

graduated in 0.001 in. and the rest has a 9-in. travel on the top slide, the toolpost being of the usual bolt and plate type. The cross traverse is 15 in. and the screw for this traverse also has a graduated collar. The apron is of the double-walled type. The six rates of feed provided by feed box vary from 20 to 104 cuts per in. and are reversible.

Floor space, 12 ft. 6 in. long by 5 ft. 8 in. wide; weight, including electrical equipment, 4½ tons.

## — 34 —

### Lathes, Chucking, Improved, 24-Inch

*C. Redman & Sons, Ltd., Halifax, England.* [Vol.70,p.215E]

Chucking lathes with hexagon turrets, and with either an all-geared driving headstock in diameter over the bed and or a cone drive, are available. Both lathes swing work 24 in. admit work 2 ft. long from the chuck to the turret face. The power feeds are obtained by means of eccentric gearing operated by a lever. The feeds range from ¼ to 1/200 in. per rev. Bars and stops for tripping the longitudinal feed auto-

matically, as well as cross stops, are provided. The hexagon turret measures 11 in. across the flats and the faces are 6½ in. wide by 4½ in. deep.

The all-geared headstock gives twelve spindle speeds ranging from 10.5 to 280 r.p.m. A friction clutch on the first motion shaft starts and stops the machine, the clutch also acting as a brake.

In the cone-driven headstock, the twelve spindle speeds range from 9 to 505 r.p.m. The hollow spindle will take bars 2½ in. in diam. Smallest diameters of the pulley are 13½ and 9 in respectively. The bearings are adjustable. A gearbox gives feeds from 4, 8, and 16 per in. to 24, 48, and 96 cuts per inch.

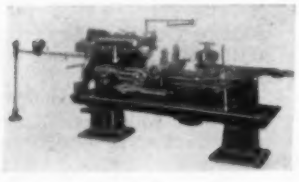
Floor space, both lathes, 10 ft. 4 in. by 4 ft. 3 in.; power required, 4 hp.; weight, all-geared machine, 4,400 lb., cone-driven machine, 4,200 pounds.

## — 35 —

### Lathe, Capstan, All-Geared, 7-Inch

*Stanley Machine Tool Co., Ltd., Halifax, England.* [Vol. 70p.255E]

The 7-in., all-geared, capstan lathe has a maximum distance from the spindle to the capstan face of 28 in., the bed being 6 ft. 6 in. long. The single-pulley headstock provides eight spindle speeds in either direction from 30 to 480 r.p.m. The forward and reverse motions are obtained through independent friction clutches. Speed changes are made through sliding gears



of heat-treated steel, mounted on a splined shaft, and friction clutches.

The spindle runs in phosphor-bronze bearings automatically lubricated, and has a 2⅛-in. hole right through. The maximum diameter of bar admitted through the automatic chuck is 1⅜ in. The chasing saddle has longitudinal and cross feed motions by hand and four leader changes are obtained through the feedbox.

The cross-slide is of steel. The hexagonal capstan is bored through and eight feeds are provided, together with six automatic trips and dead stops. The pilot wheel shaft carries an indicator with three adjustable stops for repeating lengths and depths. The working stroke of the capstan is 9 in. The capstan faces measure 4¾ in. across.

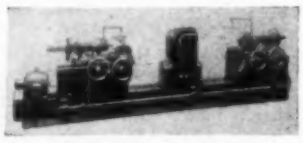
Floor space, with bar feed, 11-ft. 6 in. by 3 ft. 6 in.; power required, 5 hp.; weight, 2,600 pounds.

## — 36 —

### Lathe, Axle Journal, Re-Truing and Burnishing

*J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England.* [Vol.70,p.290E]

This has a centrally driven head with split hollow spindle, to which the main drive gear is attached, preventing the headstock being opened unless the bearing, which is in halves, and the driving gear are in correct position. Turrets for holding all the tools are employed, so that no tools have to be reset



during the various operations. The machine is of 10½-in. centers, the gap being 26½ in. deep, and it will take 8 ft. 6 in. between centers, the gage of the wheels admitted being 4 ft. 8½ in. and the diameter over the tread, 3 ft. 8 in. Both axle journals are machined simultaneously.

The drive to the central spindle is by 5-hp., constant-speed motor. Spindle speeds are 20, 30, and 45 r.p.m. The spindle flange has two driving pins for the driver. The bearing cap of the central driving head is hinged, counterbalanced, and arranged to retain one-half of the spindle and driving wheel when the bearing is unlocked and opened to allow removal of the work.

The loose headstocks have adjustment along the slides. The turret slides are adjustable longitudinally by hand or automatically in either direction by a ratchet from a rocking shaft at the front.

The four rates of automatic feed are from $\frac{3}{32}$ to $\frac{1}{8}$ in. per spindle revolution in each direction. A cross feed by hand is provided. Floor space, 15 ft. 6 in., by 3 ft. 6 in., weight, without motor, 8,075 pounds.

## — 37 —

### Lathe, Wheel, 43-Inch

*Ward, Haggas & Smith, Keighley, England.* [Vol.71, p.130E]

Built with central drive and equipped with special labor saving features for the quick changing of wheels, and for the clamping and positioning of the cutting tools, this lathe will turn wheels up to 43 in. diam. over the flanges, the maximum length admitted between the centers being 7 ft. 7½ in., between the tailstock plates, 8 ft., and between the tailstock plate jaws, 7 ft. 7½ inches.

The putting-in and removal of the wheels and axle is done at the back of the lathe and does not interfere with the tool rests at the front. An auxiliary 10-hp. motor at the left-hand end provides the traversing mechanism for the loose heads and also the rail elevating and lowering gear drive.

The lathe is driven by a 35-hp., variable-speed motor, the drive being taken through a constant-speed gearbox to the main driving shaft. The tool rests are fixed permanently at

an angle of 1 in 20, to suit the thread of the tires. They have self-acting reversible and variable feed. The tool is locked in position by air pressure, and, when so locked, cannot come loose. Suitable calipering devices are incorporated.

The loose-head spindles rotate with the axle. Each carries a strong backing-up faceplate with movable jaws to take the side pressure and to act as the back jaws of a vise. Under test the lathe took cuts ¾ in. by ¼ in. at a speed of 35 ft. per minute.

Floor space, 29 ft. 2 in. long by 9 ft. 6 in. wide.

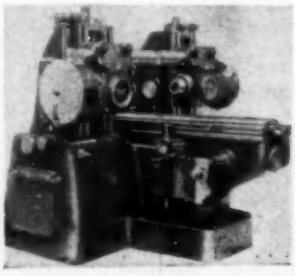
# *Milling Machines*

## — 38 —

### Milling Machine, Duplex, Manufacturing

*Wanderer-Werke A.G., Schonau-Chemnitz, Germany.* [Vol. 70,p.204E]

Available with a single headstock and support, this plain milling machine, with duplex heads and full automatic control to the table, has a working surface of 15⅞ in. wide by 5 ft. 5 in. long and automatic longitudinal travel of 45¼ in. The maximum and minimum distances between the center of the milling arbor and the table surface are 16⅜ and 4⅞ in., respectively. In the duplex machine, the maximum



and minimum distances between the spindle heads are 35⅜ and 14⅜ in., respectively, or between the standards 43¼ and 22⅜ in. The headstocks are adjustable independently and can be run at different speeds. The drive is by constant-speed pulley or by motor.

Change gears provide 36 spindle speeds ranging from 16 to 555 r.p.m. The standards can be adjusted at right angles to the table slides. The milling table has 16 feeds ranging from ⅜ to 20¾ in. per min., with quick traverse at the rate of 6 ft. 6 in. per min. The 16 feeds are altered by change gears. All table movements, including the stopping of the milling spindle, are controlled by one lever.

A geared pump supplies coolant, and central lubrication for all groups of gears is provided. The driving motor should be of about 10 hp., with speeds of 1,200 to 2,000 rev. per minute.

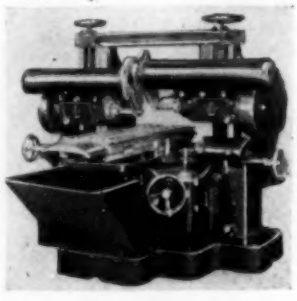
Floor space, 9 ft. 6 in. by 4 ft. 2 in.; weight, single-spindle machine, 4 tons, duplex machine, 9,600 pounds.

## — 39 —

### Milling Machine, Duplex

*E. H. Jones (Machine Tools), Ltd., Islington, N., England.* [Vol.71,p.56E]

This machine is built by Fritz Werner A.G. Berlin-Marienfelde, Germany, and has two horizontally opposed spindles, with the table passing under them. The base is a cross-shaped box-form casting. Rapid



intermittent feed and return traverse are applied to the table, and these motions, in conjunction with the automatic stop of the spindle, are controlled automatically by stops on the front of the table or by a single ball socket lever.

Drive is by a single pulley at the bottom of the base and steel pick-off gears inclosed in dustproof cases. The standard gears supplied enable 10 speeds from 15 to 135 r.p.m. and 12 feeds from ⅜ to 20 in. per min. to be obtained. The rapid intermittent and quick-return table traverses are at 120 per minute.

The spindle-head columns are carried on wide flat guides and are adjusted in a horizontal direction by screws mounted with large indexing dials. Screw adjustment is also provided in a

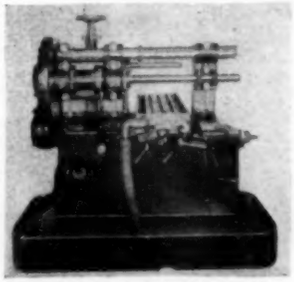
vertical direction by handwheels on top of the columns. Massive box-section overarms are mounted on each spindle-head. The table has a working surface of 50 by 16 in., and longitudinal traverse of 42 in., but tables 64 by 16 in. and 80 by 16 in. can also be supplied. With these, the longitudinal travel is 54 in. and 70 in., respectively. A single cutter arbor can be mounted between the spindle heads, when it is desired to use gang cutters.

— 40 —

## Milling Machine, Manufacturing

*E. H. Jones (Machine Tools), Ltd., Islington, N., England.* [Vol.71,p.66E]

This Werner No. 2,242 manufacturing milling machine follows the Lincoln-type milling machines, the table being carried on the bed and vertical adjustment being given to the spindle to apply the cut. The most important features are rapid intermittent and return motions



of the table, controlled automatically by stops and operated in conjunction with the disengagement of the spindle drive. The intermittent feed is used to traverse the table quickly to the cutter and across gaps in the work. Drive is by single pulley from a motor mounted on the floor or by flanged motor. The speed and feed changes are obtained by pick-off gears.

The spindle head is adjustable on a vertical flat slide, and the cutter arbor is supported at its outer end by a bracket. The table has a working surface of 48 by 10¾ in. and a longitudinal traverse of 42 inches.

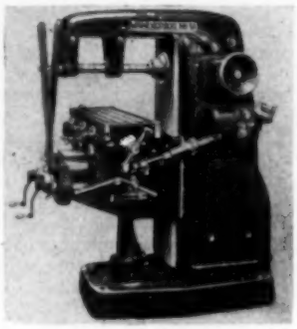
— 41 —

## Milling Machine, Plain

*Wanderer-Werke, Schonau, Chemnitz, Germany.* [Vol.70, p.206E]

In this plain milling machine, the milling spindle is set in motion, the table feed engaged, and the supply of coolant controlled by one movement of the main lever. Quick return motion for the table is engaged by the same lever. The feed and quick traverse are reversed by adjustable stops.

The table working surface is 33¾ by 9¾ in. It has an automatic longitudinal motion of 21¾ in., cross motion of 7⅞ in., and a vertical motion of 16¾ in. The last two are by hand, but can be made automatic if required.



The maximum distance between the spindle and the table surface is 17⅜ in., minimum distance, 1 in. The distance between the center of the milling arbor and the lower side of the overarm is 5⅞ in., and between the frame and the braces, 21⅜ in. The 12 spindle speeds range from 40 to 500 r.p.m. Ten longitudinal feeds range from 1¼ to 9¾ in. per minute.

A pyramid body, rectangular overarm, wide knee with narrow guide, and a laminated disk clutch for the milling spindle, feed and quick traverse motions, and centralized lubrication are constructional features of the unit. The base forms a container for the coolant.

Power required, 3 to 4 hp.; floor space, 5 ft. 9 in. x 5 ft. 3 in.; weight 2,400 pounds.

— 42 —

## Milling Machine, Plain, Twin-Overarm

*J. Parkinson & Son, Shipley, England.* [Vol.71,p.24E]

The working surface of the table is 51 by 12⅜ in., the power longitudinal feed, 30 in., and the cross feed in line with the spindle, 10 in. The maximum distance between the center of the spindle and the table top is 18½ in. All table movements have 12 rates of feed for cutting, ranging from ½ to 10.4 in. per minute, and the quick power traverses are 75 ft. per min., longitudinal; 56 in. per min., cross; and 38 in. per min., vertical, with automatic and safety trips. The largest cutter that

can be used with the arms in position is 12½ in. in diameter.

All feeds and traverses are controlled and reversed by the same levers from any of four positions, that is, either at the front or the rear of table, and on either side of the knee. Automatic lubrication is provided to all gears in column, knee, and table. A tank for coolant is provided in the base. The drive is by constant-speed pulley. The spindle is started and stopped by a friction clutch. An electric drive is easily arranged.

The spindle nose is bored No. 10 B. & S. taper, and the front flange is of standard diameter with four holes drilled and tapped for securing large face-milling cutters. Braces from the knee to the overarms are easily fixed.

The spindle has 12 speeds, from 15 to 360 r.p.m., obtained by sliding gears. The machine takes 5 horsepower.

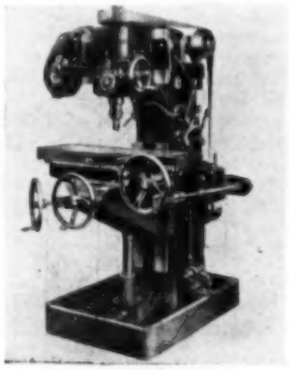
Floor space, 99 by 77 in.; weight, 5,890 pounds.

— 43 —

## Milling Machines, Slot

*Benrath Machine Tools, John Dalton St., Manchester, England.* [Vol.70,p.229E]

The Hurth slot milling machines are available in three styles, one with a horizontal spindle and the others with vertical spindles. The latter can be used for die-sinking. All



have the cutter slide reciprocated by a crank device.

The horizontal machine is designed for the production of deep or through slots and for milling keyways. It is available in three styles, one with the table stationary, another with longitudinal, transverse, and vertical movement to the table by hand, and the last with power motions, including a quick movement of the upper table, so that two loading fixtures may be used. This machine will cut slots to a maximum width of ⅜ by 3½ in. deep by 4¾ in. long, or in several settings up to 20 in. long, the longitudinal movement of the table by hand being 16 in., the cross movement, 6½ in. and the vertical, 9¼ inches.

In all machines, the automatic down feed of the milling spindle is independent of the longitudinal movement of the milling slide, and is disengaged automatically when the required depth is reached. The smaller vertical spindle machines will cut slots ¾ in. wide by 3½ in. deep by 5½ in. long and up to 20 in. by settings of the table.

The larger vertical machine is designed especially for locomotive and railway shops, and automobile plants, and will mill slots from ½ to 1⅝ in. wide by 4 in. deep by 8¾ in. long. The maximum length of slot that can be cut in more than one setting is 26 in. This machine takes 3 hp. and occupies a floor space of 70x70 inches.

— 44 —

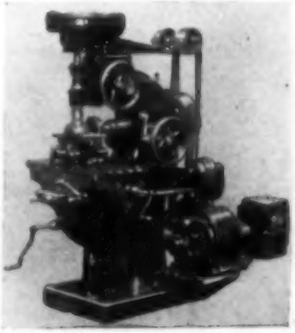
## Milling Machine, Vertical and Horizontal

*United Machine Tool Co., Ltd., Gray's Inn Road, London, W.C., England.* [Vol.70,p.231E]

This Mueller & Montag machine is of the standard vertical milling type, but is capable of milling horizontal and vertical surfaces simultaneously, the nose of a horizontal spindle projecting through the column at its throat. In place of the driving cone, a heavy drum is mounted to take a Texrope drive and act as a flywheel. From the mainshaft, twin drives are taken by belt to each spindle, vertical and horizontal. Both spindles have axial adjustment with micrometer stops. The introduction of gage blocks may be made without disturbing the original setting of the stops.

A special clamping attachment can be supplied when required. It consists of a base and four hardened-steel reversible serrated jaws, with steps similar to the usual chuck jaws. All four jaws are actuated simultaneously.

The design of the knee, sad-



dle, and table conforms to usual practice. The table has six rates of longitudinal feed. The working surface is 28¾ by 10¼ in.; the horizontal travel of the vertical spindle is 4 in., the horizontal travel is 4¾ in. Maximum distance from the vertical spindle to the table is 18 in., while maximum distance from the horizontal spindle to the center of vertical spindle is 11 inches.

— 45 —

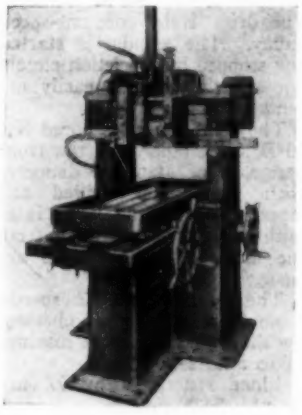
### Milling Machine, Profile, Improved

*J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England.* [Vol.70,p.303E]

The table has a working surface 16½ in. by 45 in. and a longitudinal traverse of 41 in. The machine is intended for general profiling and the table and cutter can be manipulated by handwheels from each side. The cutter spindle head is similarly removable on rollers along the cross-slide. The cutter spindle revolves in "Holfos" bronze bearings adjustable for wear and with provision for taking end thrust. The spindle has a draw-bolt to hold the cutter and is bored No. 9 B. & S. taper.

Maximum and minimum distances from the spindle nose to the table are 14¼ and 10¼ in., respectively, the distance from the underside of the slide to the table top being 12 in., and between the uprights, 26 in. Vertical adjustment of the spindle is 4 in. and the horizontal adjustment, 12 in. By means of a latch and a vertically adjustable latch plate having a number of notches, the slide can be brought down to the required position and locked while in operation. A fine screw micrometer adjustment is also available. The tracing pin bracket is arranged for two positions of the pin. The cutter spindle and the tracing pins are in line.

Drive to the spindle is by belt



from a drum at the rear, and the countershaft and drum shaft run on ball bearings.

Floor space, 8 ft. by 4 ft. 6 in.; weight, 3,250 pounds.

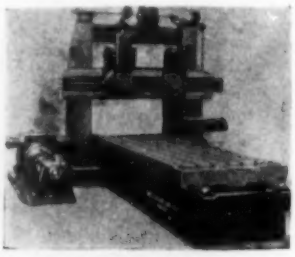
## *Planers and Shapers*

— 46 —

### Planer, Bed, Laundry-Machine

*White Machine Tool Co., Ltd., Halifax, England.* [Vol. 70,p.271E]

This planer 4 ft. 6 in. by 12 ft. in size, with Newton drive, was built for machining beds of laundry machines. A 20-hp., squirrel-cage motor is coupled flexibly to the epicyclic gearbox that forms the Newton re-



versing drive. This drive is then taken through helical bevel gears to the rack pinion shaft of the planer, and finally through a bull wheel to the rack on the table. All gears and racks throughout the machine are of steel. The machine cuts at 40 ft. per minute and returns at 200 feet.

The cross-slide and two toolboxes are raised and lowered by a 3-hp., reversing motor, mounted on the cross arm. The laundry bed to be machined is a combination of concave and convex surfaces and a former plate is used in conjunction with a standard tool box. The toolbox can be used, however, for straight or angular planing.

A selective gearbox allows any feed to be engaged. A balanced tool box is also fitted on the right-hand housing. The feeds range from $\frac{1}{64}$ to $\frac{1}{4}$ in.

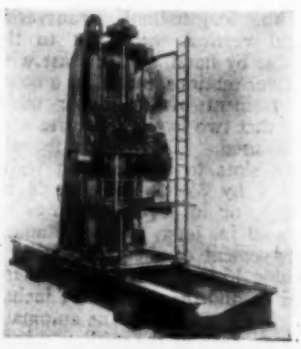
Weight, 17 tons; floor space, 12 ft. 2 in. by 26 feet.

— 47 —

### Planer-Milling Machine, Vertical and Horizontal

*Craven Bros. (Manchester), Ltd., Reddish, Stockport, England.* [Vol.70,p.293E]

This vertical and horizontal plano-milling machine for surfacing the ends of condensers or casings in built-up steel or cast iron of semi-circular or



irregular outline is illustrated, the maximum area machined being 14 ft. by 8 ft. 9½ in. high. The column is gibbed to the guide-ways, and is traversed along the bed by a screw. The saddle has a vertical movement of 7 ft. 9 in. and the column a horizontal travel along the bed of 15 ft. Two constant-speed alternating-current motors, each mounted on the column, are provided, one of 15 hp. being used for the main drive, and the other of 5 hp. for the feed motions and quick traverse.

The saddle carries a high-carbon steel spindle with conical front neck. The flange at the front end carries the inserted-tooth cutter, which has a 15 in. diam. cutting circle. The cutter spindle has an outward adjustment of 12 in. The drive to the spindle is from the motor and three-speed change gearbox. Both the horizontal and vertical feeds range in four steps from ½ to 3 in. per min. The feed and quick traverse motions are engaged by clutch. The feed changes are arranged in two sets, horizontal and vertical, and by means of the feed handles any single feed can be given to the spindle in either direction, or by engaging a suitable gear in the two feed boxes, any combination of vertical and horizontal feed can be obtained for curved or sloping surfaces.

— 48 —

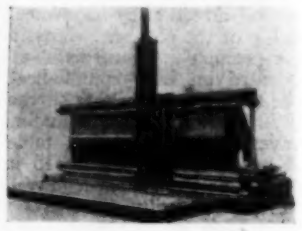
### Planer, Horizontal and Vertical, Wall-Type, Self-Contained

*Craven Bros. (Manchester), Ltd., Reddish, Stockport, England.* [Vol.70,p.304E]

This vertical and horizontal planer is of the self-contained wall type, the horizontal stroke being 24 ft. and the vertical stroke, 12 ft. The machine has a Shanks feedbox. The foundation bed is planed to take the vertical bed and also on the front edge of the worktable, the latter being planed on top with planed tee grooves and prepared for extension if required. The vertical bed has two horizontal screws for driving the traveling standard. Brackets at the back support the vertical bed.

The traveling standard is of box section and is supported by a wide copy surface casting to prevent overhang. The saddle on the traveling standard is balanced and has a wide steel incutting toolslide.

The drive is by a direct-connected, reversing, 25-hp. motor and gearbox. The stroke is controlled by dogs and two disks, one for the vertical and one for the horizontal motion. Positive and reversible feed to the traveling standard and the saddle is taken from the feed gearbox. Safety interlocking devices are provided for all



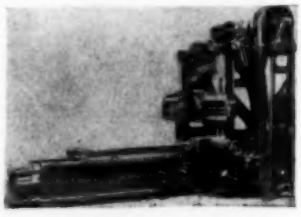
motions. The width of the incutting speed is 32 in. horizontally and 18 in. vertically, the work table being 24 ft. by 7 ft. over-all, including the part which is cast to the foundation bed.

— 49 —

### Planer, Screw-Driven

*White Machine Tool Co., Ltd., Halifax, England.* [Vol.71,p. 155E]

This machine will plane work up to 3 ft. 3 in. wide by 3 ft. high by 9 ft. long. The chief features are the arrangement of the drive and the circular motion to the toolbox on the cross-slide. Drive is taken from the mainshaft to a countershaft on a cast-iron bridge bolted on top of the housings. The countershaft gives three cutting speeds of



24, 36, and 48 ft. per min., with a constant return speed of 100 ft. per min. Controls are brought to the front of the cross bridge within easy reach of the operator. The countershaft pulleys are of the flywheel type.

The drive from the countershaft to the machine pulleys is by open and crossed belts, double-helical gears to the thence from spiral bevels and screw. The screw is mounted at the front end in ball journal bearings and at the driving end in double ball journal bearings and a heavy double ball thrust bearing. The table nut consists of two, long phosphor-bronze castings mounted in a cast-iron bracket. The toolbox on the cross-slide is of the firm's standard type with automatic variable and reversible power and hand feeds in horizontal, vertical, and angular directions.

In this machine, the clapper box has a swiveling motion for moving the tool through 180 degrees. The radial action of the toolbox is actuated by a hand lever through a worm and segment.

Floor space, 20 ft. by 9 ft.; power required, 12½ hp.; weight, 9 tons.

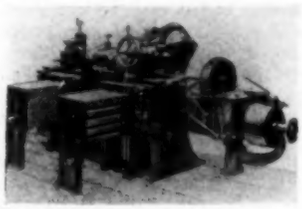
— 50 —

### Shaper, Traversing-Head, Heavy-Duty

*Ormerod's Tool Co., Ltd., Hebden Bridge, England.* [Vol. 70,p.243E]

This 14 to 16-in. stroke, traversing-head shaper, with Whitworth link motion, meets the requirements of railway and marine engineers, where heavy and bulky forgings have to be machined. The rapid power traverse is independent of the ordinary feed motion. Direct spur gearing of heat-treated steel is employed and safety devices are incorporated. Further, the feed can be changed without stopping the machine.

The box-section head is 6 ft.



long by 1 ft. 8 in. wide by 2 ft. 10 in. deep, the front having three bearing surfaces for the vertical table slides. The tool head can be swiveled through 180 deg., and the internal self-acting down-feed motion is 6 in. long. A worm-and-quadrant toolbox is fitted for the machining of internal curves. The Whitworth quick-return motion gives a ratio of 2¼ to 1 on all lengths of stroke. The self-acting feed along the bed has six rates of feed.

The headstock may also be moved along the bed by handwheel control, the traverse being 3 ft. 9 in. Its drive is by an eight-speed gearbox from fast and loose pulleys. The two tables are of box section, 18 in. long by 15½ in. wide by 14 in. deep, the maximum distance from the ram to the table top being 18 in. The tables are traversed along the bed by hand. Elevating the table is done from the front.

Floor space, 10 ft.x6 ft. 6 in.; power required, 4 hp.; weight, 5,400 pounds.

— 51 —

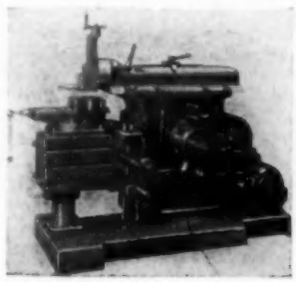
### Shaper, Improved, 18- to 20-Inch Stroke

*Fletcher Bros., Halifax, England.* [Vol.70,p.270E]

This 18- to 20-in. stroke, crank-driven shaper has nine speed gear changes built into the body. Incorporated with the gear changes is a friction clutch. The slowest ram speed is eight strokes and the fastest 98 strokes per minute. Without moving his position, the operator can start or stop the machine, effect all gear changes, adjust the length of stroke, and alter the feed and the ram position. The ten feed variations from 0.009 to 0.096 in. are obtained by a cam.

The machine is planned for convenient control and quiet operation. Controls are centralized.

The table support is of the round pillar type, locked to the underside of the table by a large split bearing. The base is extended at the rear to carry the 3-hp. motor, which drives through a rawhide pinion. The vise admits work 12x12 in. The maximum depth of work admitted is 17½ in., down feed of



the tool box being 7 in., done by hand.

Floor space, 6 ft. 6 in. x 4 ft.; weight, 3,000 pounds.

## *Presses*

— 52 —

### Press, Eccentric, Automatic, Single-Arm

*Soag Machine Tools, Ltd., Westminster, S. W. England.* [Vol.71,p.55E]

The single-arm automatic eccentric press works automatically from the reel and straightens and blanks. No follow up dies are required and the press is especially suitable for combination tools. The drive is direct to the flywheel, for which fast and loose pulleys or back-gears are provided. The feed is of the positive claw type, and is adjustable.

The machine illustrated will take material 7 1/16 in. wide, the

gap measuring 7½ in. The plunger stroke may be 1⅛ in. or 1 5/16 in., and the feed is up to 7½ in. The number of strokes may be from 40 to 60 per min., the maximum cutting area about 1.44 sq.in., and the maximum pressure, 45 tons. The driving power required is 1½ hp. Net weight 4,180 pounds.

A smaller machine is also available and also a larger, which will take material 7⅞ in. wide with a feed up to 9⅞ in. The power required is 2 hp. and the net weight is about 5,940 pounds.

— 53 —

### Press, Straightening

*Leo C. Steinle, Ltd., Marsham St., Westminster, S. W., England.* [Vol.70,p.228E]

This hydraulic straightening press will exert 50 tons, with drawback at 2 tons, and the largest shaft that can be straightened is 4 in. in diam-

eter. The stroke of the ram is 6 in., and the throat, 6 in. also. The oil pump for producing the pressure is contained in the column.

A spindle placed in the center of the table can be raised or lowered by handwheel to act as a positive stop to the shaft to be straightened. An indicating dial slides on a long precision rule. The centers slide in ball bearings so that the crankshafts can be moved easily to the right or left, and a dial enables the shaft to be tested between centers for out-of-roundness. After the straightening operation, the centers return by spring pressure.

Weight, 2,750 pounds.

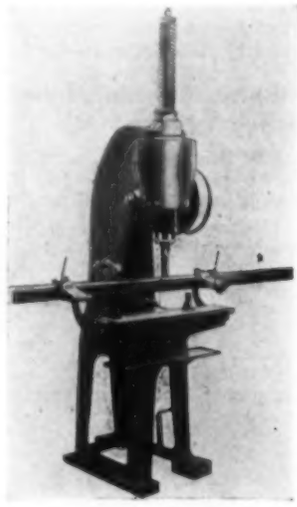
— 54 —

### Press, Straightening, Power-Driven, 10-Tons

*Oldfield & Schofield Co., Ltd., Boothtown, Halifax, England.* [Vol.71,p.103E]

This straightening press will admit bars up to 3 ft. 6 in. long between centers and 6 ft. long on the roller bearers. It is especially adapted for mass production work, for straightening hardened and case-hardened tubes, round, square, or rectangular bars, and camshafts. An indicator reads directly the amount the work is in error and at the same time indicates the inverse bending required to overcome the elastic limit of the material.

The workhead bar is supported by four brackets on a stout shaft. One bracket carries the indicator, which moves with the workhead bar. Tapered



articles can be straightened without additional accessories.

Width, left to right of the fixed bar, 7 ft. 5 in.; height, 9 ft. 3 in.; weight, 2,000 lb.; power required, 8 horsepower.

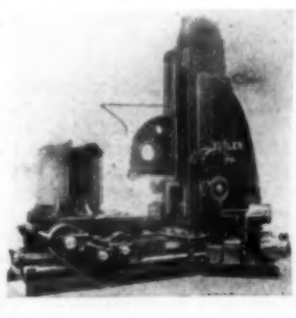
## *Punching and Shearing Machines*

— 55 —

### Punching and Slotting Machine, 48-Inch Stroke

*Butler Machine Tool Co., Ltd., Halifax, England.* [Vol. 71,p.78E]

The maximum length of stroke is 48 in., and the minimum length, 6 in. The stroke movement is operated by a 50-hp., variable-speed, reversing motor. The ram and toolholders are counterbalanced by a weight moving between guides inside the column. The stroke movement and the balancing device are lubricated automatically. The base slide for the table serves as a reservoir for the cutting lubricant.



The stroke adjustment is effected by means of a dial with adjustable dogs. This dial is directly connected with the main drive and reversing switch, and carries a safety device giving close control of the stroke movement. Various toolholders may be used. The vertical range of a snout tool is 6 in. minimum height above the table, and 8 ft. 3 in. maximum height.

The table is 6 ft. 6 in. square and is mounted on slides. Longitudinal and transverse movements of 48 in. are available. A reversible, self-acting feed motion and also a self-acting circular motion, with quick power movements in all directions, are operated by a 7½-hp. motor. The feeds and quick power traverses are completely controlled from a push-button station. A range of ten feeds and two speeds of quick power traverse are available instantly.

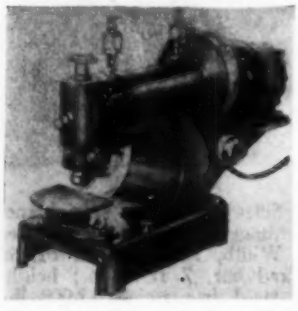
Height, 17 ft. 6 in.; weight, 35½ tons.

## — 56 —

### Nibbling Machine, Small, Bench Type, No. 0

*J. P. Stone & Co., Ltd., Finsbury Pavement, London, E. C., England.* [Vol.71,p.66E]

The No. 0 nibbling machine is intended primarily as a bench machine for cutting thin material up to 14 gage. The depth of throat is 7¼ in. and the cut-



ting speed 60 in. per min. The drive is direct by a ¼-hp. motor, which is furnished. A circle-cutting attachment is available.

Floor space, 8½ in. by 24 in.; height, 15¼ in.; weight, 132 pounds.

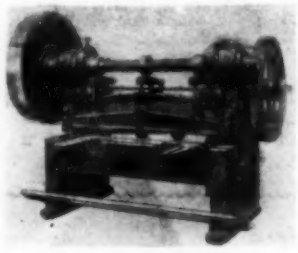
## — 57 —

### Shears, Guillotine, Improved

*Scott Bros. (Halifax), Ltd., Halifax, England.* [Vol.70,p. 290E]

A range of high-speed guillotine shearing machines in various sizes to shear mild steel plates ranging from 3 ft. to 8 ft. wide and from $\frac{5}{16}$ to ¾ in. thick is now being manufactured. The machine is arranged to make 30 strokes per minute. In operation, the ram stops automatically at the top of each stroke and is restarted by the pedal. A peg inserted in the clutch plate enables continuous cutting to be performed. A scroll on the face of the moving clutch comes in contact with a hardened steel roller when the slide is approaching the top of the stroke and withdraws the clutch automatically.

Suitable apparatus is provided



for holding down the plate during the shearing process, and two extension arms are also fitted at the front. In addition, there are two adjustable front gages and an adjustable length gage at the rear. A short gap enables long plates to be trimmed. All fast running bearings are of the ring-oiled type and fine adjustment to the bottom blade is now provided by means of taper gibs. Drive is by fast and loose pulleys.

Floor space, 7 ft. by 5 ft.; power required, 6 hp.; weight, 5,300 pounds.

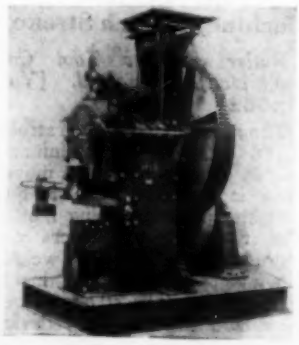
## — 58 —

### Shears, Bar, Open-Ended

*Henry Pels & Co., Ltd., Osnaburgh St., London, N. W., England.* [Vol.71,p.54E]

The machine makes 30 strokes per min. and takes up to 10 hp. Without changing the blade, squares up to 2 in., rounds up to 2¼ in., and flats of equivalent section can be cut. With a special upper blade having a greater cutting angle and thus slightly distorting the falling-off ends, flats up to 1¼ in. can be cut, while with profiled blades, angles and tees up to 4 x 4-in. can be sheared. Hot shearing can be done on squares up to 3½ in., rounds up to 4 in., and flats of equivalent section.

As usual, the frame consists of rolled unbreakable steel plates. The drive is by a fly-



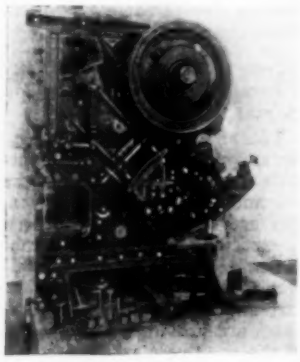
wheel shaft, through an eccentric shaft actuating the slide, to a plunger. The blades are interchangeable and are easily accessible. Stop motion is provided by a claw clutch. The clutch disengages automatically at the top of each stroke. If desired, the machine can be made to operate continuously.

## — 59 —

### Shears, Plate-Splitting, and Punch

*Henry Pels & Co., Ltd., Osnaburgh St., London, N. W., England.* [Vol.71,p.67E]

This machine is a combined plate-splitting shear and punch with bar, angle, and tee-bevel cropper and notcher. It will shear plates up to ½-in. thick, trim plates ⅝-in. thick and shear flats 5½ in. by ⅝ in. sec-



tion, at one stroke. It will punch holes up to 1 in. in diameter through ½-in. plates or ⅝-in. holes through ¾-in. plates, the gap measuring 12 in. Without change of blades, it will crop rounds up to 1¾ in., squares up to 1⅛ in., and angles and tees in proportion. With a notching attachment having square blades 2 in. wide, it will cut square notchings up to 3x3x⅜ in. in the ends and in the center of flanges, the webs of standard joists and channels, and in the center of angles, the maximum depth of notching in plates being 3 in., while triangular notchings for a maximum depth of 2¼ in. can be cut at the end and in the center of plates, flanges and tees in thicknesses up to $\frac{5}{16}$ inch.

The stroke of the shears and the cropper is 1⅜ in., the punch, 1¼ in., 40 strokes per minute being made, and 4 hp. being required.

The slides work in box guides with adjustable wearing strips. All bearings have phosphor-bronze bushings, with journals ground. The frame is built up of armor plate.

## — 60 —

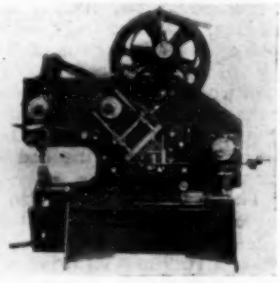
### Shear, Plate-Splitting

*Selson Engineering Co., Ltd., Hatton Garden, London, E. C., England.* [Vol.71,p.88E]

This plate-splitting shear, combined with a universal punching machine and bar, angle, and tee bevel cropper, will cut material of any length and width up to $\frac{11}{16}$-in. thick, and flats in one cut up to 4x1 in. or with a special blade, 9x$\frac{13}{16}$ in., the length of the blade being 11 inches.

As a section shear, it will cut at right angles angle iron up to 5x$\frac{7}{16}$ in. or 6x½ in., rounds up to 2 in., squares up to 1¾ in., and various sections on the bevel, in addition to joists and channels.

As a punching machine, it will punch 1¼-in. holes through



⅞-in. plate or 1-in. holes in 1-in. plate, the gap being 22 in. The machine makes 20 strokes per minute and takes about 8 horsepower.

The body is built up of steel plate, all shafts are ground, and all slides run in adjustable bearings. A special locating device is applied to the punch. It remains on the material as long as desired.

Net weight, 4 tons.

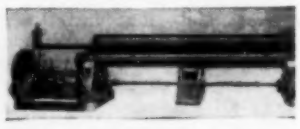
# *Other Machines*

## — 61 —

### Bending Machine, Plate

*Scott Bros. (Halifax), Ltd., Halifax, England.* [Vol.71,p. 145E]

This plate-bending machine of the three-roller type takes plates up to 10 ft. wide by ½ in. thick for the production of parallel or taper sections or tubes. The steel rolls are arranged in pyramid fashion, the top roll applying the pressure to the plate. The top roll is 11 in. in diameter and the bottom rolls are 9 in. in diameter. The rolling speed is 17 ft. per minute. If preferred, the machine can be



coupled direct to a 15-hp. motor.

The gearbox gives both forward and reverse motions to the bottom rolls and to the movement of the top roll. Friction clutches control all motions. For withdrawal of the tubes, the top roll outer bearing swings clear. The other end of the roll is extended and housed in a separate bearing, thus making it self-supporting during this operation. A center support with auxiliary rollers under the bottom rolls prevents deflection.

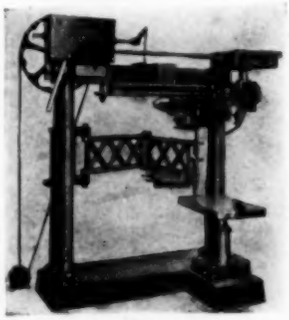
Floor space, 16 ft. 2 in. x 3 ft. 9 in.; weight, 6½ tons.

## — 62 —

## Cutting Machine, Oxygen-Jet, Universal, Improved

*Godfrey Engineering Co., Ltd., Wood Green, London, N., England.* [Vol.71,p.53E]

For the most part the mechanism of this machine is similar to that of the No. 1 standard type, but the machine is lighter, weighing about 1 ton. The open frame gives it a clear space for feeding work from the rear or side. The table has been redesigned and is of piano-



stool type. The screw adjustment enables the height to be suited to the work. As this table does not rotate when the machine is in operation, circular work is done by means of a rotary cutting head.

By means of the jointed arm, on template work it is possible to get a range of cutting length of 5 ft. x 2 ft. or 3 ft. square. The machine is claimed to cut to a line on any shape.

## — 63 —

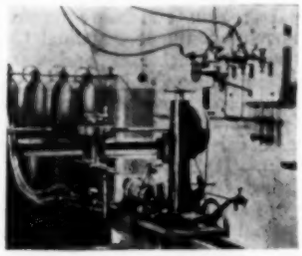
## Cutting Machine, Torch, Autogenous

*Premier Steel Tube Co., Ltd., 15-19 Kingsway, London, W. C., England.* [Vol.71,p.145E]

This torch-type cutting machine consists essentially of a column carrying the burner, two work-supporting tables, and a bedplate, the length of which can be arranged to suit any length of work. The machine will cut through iron or steel up to 12 in. thick, and with special burners, up to 24 in. thick.

The work tables are carried on trolleys which travel longitudinally in front of the machine, and they also have vertical adjustment. A ½-hp. electric motor actuates the various movements of the burner, such as automatic feed in the cross, longitudinal, and vertical directions. The column has longitudinal movement the whole distance along the bedplate. On the standard bed, the feed is 6 ft. 6 in. long.

The burner arm is carried on



the column, and has a 12 in. vertical adjustment by hand or automatically, a cross movement of 2 ft. 10 in., also by hand or automatically. The burner slide has radial movement.

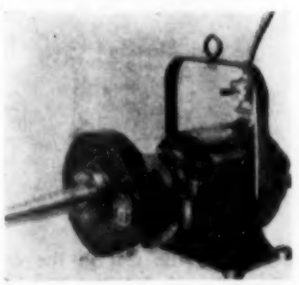
The operator can reverse the feed by trip lever, and the cutting speed can be adjusted to a graduated disk during the progress of the work. It is claimed that cuts to within ⅛ in. can be made. The burners are adaptable to the use of acetylene, hydrogen, lighting gas, or producer gas.

## — 64 —

## Filing Machine, Electric, Flexible-Shaft

*S. Wolf & Co., Ltd., 115 Southwark St., London, S.E., England.* [Vol.71,p.133E]

A large range of rotary files, rasps, and milling cutters can be carried on this flexible-shaft, electric, filing machine for operations on dies and similar jobs. The ¼-hp. driving motor is fitted with a gear reduction to give an approximate speed of 1,200 r.p.m. to the flexible shaft.



The latter is 4 ft. long, is fitted with ball bearings, and has a split-collet device for holding the files.

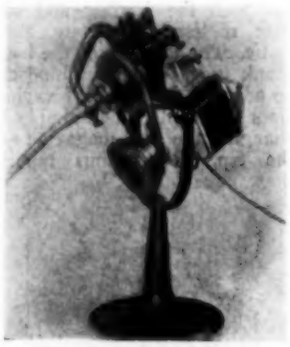
For grinding and polishing, the flexible shaft may be arranged to rotate at 5,000 r.p.m. The flexible shaft is then attached direct to the armature shaft of the motor.

## — 65 —

## Filing and Polishing Machine, Flexible-Shaft

*S. Wolf & Co., Ltd., 115 Southwark St., London, S.E., England.* [Vol.71,p.156E]

This "Vario-Flex" flexible-shaft outfit is designed for grinding, polishing, filing, and drilling, and is arranged to take 84 different tools. It consists mainly of a ¼-hp., ball-bearing motor, mounted adjustably on a stand and driving a secondary shaft through a four-step cone pulley. The four speeds obtained are from 700 to 3,200 r.p.m. Higher speeds are ob-



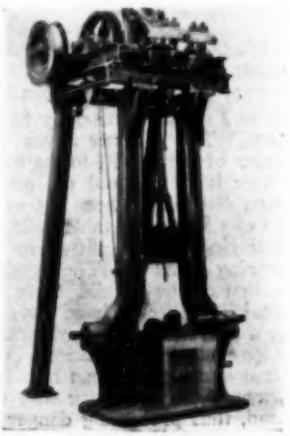
tained by means of a friction drive attachment from a flange on the secondary shaft, the range being from 6,000 to 13,000 r.p.m. The heavy shaft has a ball-bearing head and a collet for tools, and the lighter shaft has a toolholder. A filing attachment can also be supplied. The drill chuck is of ¼-in. capacity.

## — 66 —

## Hammer, Drop, Self-Contained, 3-Cwt.

*Brett's Patent Lifter Co., Ltd., Foleshill Works, Coventry, England.* [Vol.70,p.214E]

This single hammer of comparatively small capacity is intended for special work or for small drop-forging work. Although shown in a 3-cwt. size, the machine is built in standard sizes of 2½, 4, 5, 6 and 7 cwt., the drive in all cases



being by belt from an electric motor or from lineshafting to a flywheel pulley.

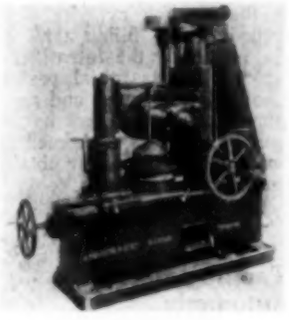
The hammer is built specially for accuracy of work, the guide rods being fitted into machined recesses in the block and also secured by additional bolts with adjusting pins and nuts. While the hammer is self-contained, two struts at the back provide extra rigidity.

## — 67 —

## Hobber, Spur-Gear, Production, Special

*J. Holroyd & Co., Ltd., Milnrow, near Rochdale, England.* [Vol.70,p.279E]

For the quantity-production of spur gears up to 18 in. in diameter by 12 in. depth of face and 5 d.p., this hobber uses a parallel hob, the spindle of which is permanently set at an angle to correspond with the helix angle. A bed carries both an upright for the cutter head and also a work-table. The table is kept central by a spindle revolving in adjustable taper bearings and is driven by worm gearing. The saddle has hand adjustment and also quick withdrawal from the bed. For repetition work, by means of an adjustable stop, it



is returned immediately to the same position, locking handles clamping it to the bed. The work-mandrel can be swung clear to facilitate removal of the work.

The balanced cutter head carries a 6-in. hob and has vertical down feed and quick return motion by power, also adjustment by hand, an automatic knock-off motion being provided. The cutter spindle has an outer support. Spindle speeds are 40 and 50 r.p.m., the down feed of the hob being from ⅛ to 1/70 in. per revolution of table.

Floor space, 3 ft. x 7 ft.; net weight, 4,450 pounds.

## — 68 —

## Riveter, Pneumatic-Hydraulic

*Aabacas Engineering Co., Ltd., Liverpool, England.* [Vol. 71,p.129E]

This pneumatic-hydraulic riveting machine is built by Hydraulik, G.m.b.H., Duisburg, Germany, and is self-contained

with the necessary water. Compressed air forms the working medium. The actual riveting operation is done hydraulically, the pressure being intensified by the use of a piston and a ram on the same rod. The air presses on the larger piston, while the smaller ram acts on the water in an adjoining cylinder to produce the hydraulic pressure. Air at 85 lb. per

sq.in. is used and the hydraulic pressure obtained is about 2,800 lb. per sq.inch.

The riveting head includes a riveting cylinder, a return cylinder and the pressure intensifier arranged along the frame. A closed tank arranged in the suspension contains the necessary water. A single lever is used to start and control the movement.

At the return stroke, compressed air is allowed to pass under the return piston of the riveting head, the snap being thus withdrawn, while the water in the riveting cylinder is returned to the filling tank and the piston of the intensifier is returned to its initial position. The need for pumps and an accumulator is avoided by this construction. It is claimed that uniform pressure is obtained throughout the stroke.

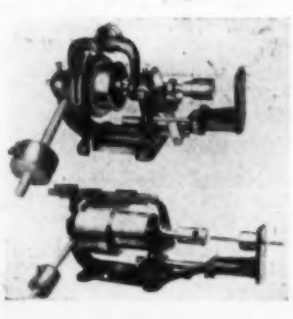
## — 69 —

### Tapping Machines, Automatic

*Loranco, Ltd., 65A Fenchurch St., London, E.C., England.* [Vol.70,p.215E]

These automatic tapping machines have a compensating device which counteracts automatically the breaking stresses which may arise from dull taps, variations in material, small holes, or the tap striking the bottom of a blind hole.

The smaller machine is used for tapping holes up to ¼ in. in mild steel. The belt drive provides one forward speed and a fast reverse. A stop can be set for the length of tapping. The



work is expelled automatically. Different fixtures are used to suit the work.

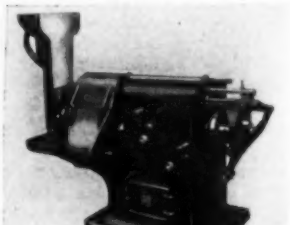
The larger machine, arranged with a die on the spindle, has a tapping capacity of ½ in. in steel and ¾ in. in brass. No gears or clutches are employed. Production of ¼-in. nuts is given as 2,000 per hour.

## — 70 —

### Tapping Machine, Automatic, for Pipe Unions

*Alfred Herbert, Ltd., Coventry, England.* [Vol.70,p.270E]

This Kosfeld machine for tapping pipe unions and gas sockets has both the feeding and tapping motion completely automatic. The taps are of the bent-shank type. Each machine can be adapted for work of various sizes within its range simply by changing the feed magazine and the tap, the various tapping



speeds being obtained by means of a gearbox through a conveniently located lever.

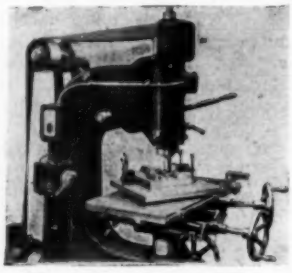
The machines are available in four standard sizes, the two smaller of which can also be supplied as double-spindle units. In all machines, the tapping spindle is disengaged automatically in case of overload. The smallest machine in the range has an output of about 320 pieces per hour tapped ¼-in. gas thread or 220 pieces tapped ½-in. The hourly capacity of the largest machine is 45 pieces tapped 2½-in. gas thread, or 40 pieces tapped 3-in. gas thread.

## — 71 —

### Boring Machine for Pattern Makers

*Wadkin & Co., Leicester, England.* [Vol.71,p.34E]

This machine will bore holes up to 3 in. in diameter by 12 in. deep. The distance from the center of the spindle to the main frame is 20 in., and the maximum distance between the spindle chuck and the table is 25 in. Ball bearings are fitted to all running spindles. The vertical motion of the spindle, 12 in., is obtained either by hand lever or by a pedal below, and adjustable stops control the movement. The bit or cutting tool can be withdrawn from the work into the head, thus preventing danger to



the operator when fixing or removing work.

The table measures 2 ft. 9 in. x 1 ft. 7 in. and has compound movement, the longitudinal traverse by steel rack and spiral pinion being 30 in., while the transverse movement is 18 in. by handwheel and screw. The table can be raised or lowered 9 in. It has tapped holes for fixing fences and clamps, and stops are provided for the longitudinal and cross movements. An auxiliary, hand-operated table, 18 in. square, turns on a fixed center pin in the main table.

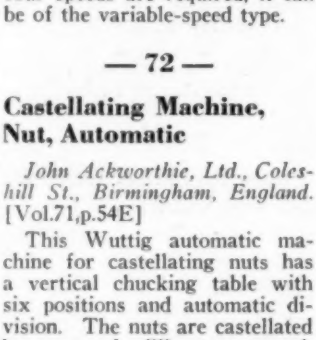
The standard speeds for the boring spindle are 1,250 and 1,800 r.p.m., but for recessing, shaping, and grooving, arrangements can be made for two additional speeds, namely, 2,500 and 3,600 r.p.m. Drive is by a 3-hp., electric motor, and, when four speeds are required, it can be of the variable-speed type.

## — 72 —

### Castellating Machine, Nut, Automatic

*John Ackworthie, Ltd., Coleshill St., Birmingham, England.* [Vol.71,p.54E]

This Wuttig automatic machine for castellating nuts has a vertical chucking table with six positions and automatic division. The nuts are castellated by means of milling cutters and, in order to avoid the rounded



bottom of the slot in the case of large nuts, a rising and falling device is available for the cutting plate. The nuts are brought automatically in front of the first, second, and third cutters, and three nuts are dealt with simultaneously.

The feed of the cutter can be varied according to the different depths of slot required and the speeds can be changed by means of a gearbox, four cutter-speeds being available. Outputs are as follows: Nuts with slots ⅛ in. deep, 700 pieces per hour; ⅛ in. deep, 380 per hour; ⅜ in. deep, 290 per hour; ⅜ in. deep, 210 per hour. These figures are without the rising and falling attachment, which reduces the output by about one-third.

## — 73 —

### Paint Spraying Machine, Automatic

*Aerostyle, Ltd., 176 St. John St., London, E. C., England.* [Vol.70,p.256E]

This automatic machine is primarily designed to deal with small or medium-sized compact articles limited to 10 in. long by 7 in. across. Lengths up to 15 in. may be dealt with by means of a second spray. On a large turntable are carried spindles set in circular form, the number varying from 12 to 36. They carry chucking means or fixtures for the work. The loading and unloading position is in front of the machine. The drive is direct from the lineshaft to a friction pulley controlled by a

lever at the side of the machine. A secondary shaft belted to the mainshaft drives through bevel gearing, a cam indexing mechanism and braking system, which turns the table the amount required to bring each work spindle under the paint spray in turn.

While spraying proceeds, the work spindles rotate also. The speed of rotation is variable by means of a three-step cone drive.

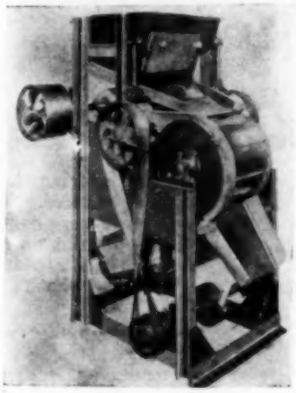
The sprayers are carried on the universal angle plates, and are thus adjustable for varying the distance from the object and also for directing the spray at the desired angle in the horizontal or vertical planes. Each sprayer has a control lever. Surplus material and fumes are dealt with by means of a centrifugal fan. The table can be conveniently washed down with solvents. The sprayers, of course, must be supplied with compressed air at any pressure above 45 lb. per sq.inch.

— 74 —

### Separator for Chips, Electro-Magnetic

*Rapid Magnetting Machine Co., Ltd., Birmingham, England.* [Vol.71,p.257E]

This high-intensity, electro-magnetic separator combines the features and operations of the drum and chute types. It separates chips containing a high percentage of fairly large mag-



netic material, together with oxide and fine particles of magnetic material. Practically 100 per cent separation is claimed. Machines of this type are made in four sizes, the smallest dealing with ¾ to 1 ton of chips per 8-hour day and the largest with from 3 to 4 tons.

The framework is made up of channels, plates, and angles riveted together. At the top is a hopper with an adjustable feed aperture, under which is supported, by suitable brackets and links, a jig-shaken feed tray that passes a stream of material of adjustable depth on the rotary drum. This carries to its underside the main proportion and larger pieces of the magnetic material, discharging this automatically down the adjustable diverting chute at the front of the machine. Beneath the drum, to receive the falling treated material, is the inclined magnetic chute. It is jig-shaken by eccentric drive. The magnetic chute has across the width of its face a series of five magnetic bars, three primary and two secondary, of triangular shape, over which the material passes. These bars intercept any remaining iron, everything non-magnetic being finally discharged at the bottom. The magnet coils can be wound for 250-volt, d.c. circuits.

— 75 —

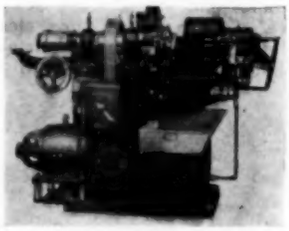
### Turning Machine, Nut, Special

*John Ackworthie, Ltd., Coleshill St., Birmingham, England.* [Vol.71,p.65E]

This Wuttig special nut automatic for producing steel nuts from the bar will countersink the nuts on both sides and tap them ready for use. The machine may be driven either by a countershaft or by a motor. In each case, the spindle speed is increased as the parting-off tool approaches the center of the rod when cutting off, thus giving a constant cutting speed.

An attachment has a transfer arm which picks up the nut blanks as they are cut from the bar and transfers them to the tapping arrangement, having a bent shank tap. When tapped, the nuts drop into a pan.

Machines are available in four



sizes, suitable for nuts up to the ¼-, ⅜-, ½-, and ¾-in. sizes, respectively. With the smallest machine the output is 28, ¼-in. nuts or 16, ½-in. nuts per min., and the production of the largest machine is seven ½-in. nuts or three, ¾-in. nuts. The output is the same whether the nuts are tapped or left blank.

## *Testing Equipment*

— 76 —

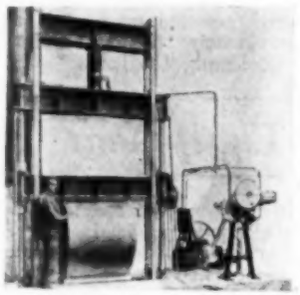
### Testing Machine, Tube, 50-Ton

*T. C. Howden & Co., Birmingham, England.* [Vol. 70,p.216E]

Alfred J. Amsler & Co., Schaffhouse, Switzerland, built this machine for testing tubes by pressure on the crown. The machine consists of three separate parts, namely, the testing machine itself, a pendulum dynamometer, and an oil pump to produce the pressure in the machine.

The testing machine has a frame of two H-section girders joined by cross sleepers, two uprights, and a fixed crosshead, above which the hydraulic cylinder is carried. The ram supports the top cross beam, which is connected to a bottom beam by rails, these being linked to form a movable parallelogram. This beam is guided by bearings along the uprights, and the height of the otherwise fixed lower cross-beam can be adjusted by a handle.

The handle being turned, the adjustable cross-beam is lowered onto the pipe and oil lifts the ram and consequently the parallelogram frame. The pipe, abutting against the fixed beam or a wooden intermediary, is thus compressed. The beams of



the parallelogram move somewhat, so that their pressure is distributed evenly along the crown of the pipe. Control valves on the dynamometer govern the movement of the ram and the test speed can be regulated. The dynamometer has a range of sensitiveness of 50, 25, 10, and 5 tons. A recording device fitted on the dynamometer plots a diagram of the test. The initial distance between the pressure beams can be adjusted from 24 to 80 in., and the distance between the uprights is about 71 inches.

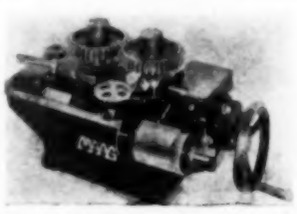
— 77 —

### Testing Machine, Gear

*Sulzer Bros., Bedford Square, London, W.C., England.* [Vol. 70,p.231E]

This gear-testing instrument checks the center distance and concentricity, and records the errors on a diagram. The gears are mounted on two slides by means of vertical spindles and a screw with handwheel adjusts the centers, a vernier scale enabling the center distances to be set to within 0.0004 in. Tapered interchangeable mandrels can be changed to suit the bores of various sizes of gears.

For the purpose of setting, the free slide is locked by a plunger, but in operation it is free. A spring holds the gears in mesh, and as they are rotated, any departure from the nominal center distance causes a movement of the free slide. This movement is transmitted to a dial indicator, which shows the amount of eccentricity or other tooth errors. The indicator also operates a recording finger, which traces a diagram on ruled paper carried



on a drum. For testing batches of similar gears, a master-gear can be employed. The apparatus gives total errors of both sets of profiles in engagement.

— 78 —

### Testing Machine, Ductility, Sheet-Metal

*W. & T. Avery, Ltd., Soho, Birmingham, England.* [Vol. 71,p.102E]

A clamped or slip distention test can be made on sheet metal by using a hardened steel ball, while the thickness of the metal and the distended height of the test specimen can be measured by a micrometer. The device is suitable for the control of sheet-metal work for press and other manipulations, while close control can be exercised in the annealing of ferrous sheet metal

and cold-rolled, non-ferrous sheets.

The machine is a vertical axial assemblage of distending spindle, inner and outer members interconnected by screw threads, together with a cross handle, the central portion of which carries the upper orifice washer. The 2-in. test specimen is inserted in the aperture below the cross handle, the thickness being measured and the graduations shown in the aperture below the handles. The appliance will clamp and distend mild steel up to 10 B.G., but is preferably confined to thicknesses not exceeding 16 B.G., or $\frac{1}{8}$ in. thick.

— 79 —

### Testing Machine, Hydraulic, 500-Ton

*Greenwood & Batley, Ltd., Leeds, England.* [Vol.71,p.182E]

This testing machine is especially adapted for testing chains, cables, and anchors. It is of the sliding-bed type, with

a straining cylinder, lever system, and controlling valves located at the weighing end. The bed consists of four cast-iron troughs, weighing 14 tons each, and a widely spaced cradle, which is large enough to ad-

mit the usual type of stockless anchors with which most British ships are equipped.

The whole of the bed is directly connected to the end of the main pressure ram, and is mounted on rollers which permit sufficient horizontal movement to allow specimens of various lengths to be tested. The return movement of the ram and bed is arranged for by means of two low-pressure hydraulic cylinders.

Chain and cable up to 90 ft. long can be tested at loads up to 350 tons, while specimens up to 10 ft. long can be tested up to the full 500 tons. The total weight of the machine is approximately 200 tons, and the total length, 130 feet.

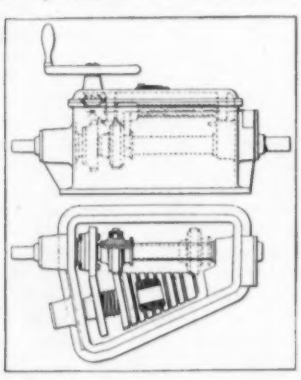
# *Transmission Equipment*

## — 80 —

### Speed Changer, "Varatio"

*Variable Power Transmissions, Ltd., Britannia Works, Bassein Park Rd., Shepherd's Bush, W., England.* [Vol.70, p.292E]

This speed increasing or reducing gear, with speed ratios up to any required variation, will transmit any power required from a fraction up to 1,000 hp. or more. The speed can be varied in practically any number of steps according to the design, and the drive is positive in every position, the load being held when changing either up or down. The efficiency claimed is between 92



and 95 per cent at any speed, and the changes are made easily and quickly without the danger of clashing.

The nest of cone wheels is driven from the end driving bevel wheel by clutch teeth on the large cone wheel, which may be operated either separately or simultaneously with the clutches between the wheels.

Gears of this type are intended for motor cars and for industrial drives of all kinds.

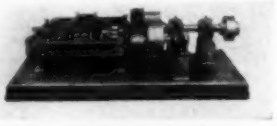
## — 81 —

### Speed Changer, Infinitely Variable

*Crofts (Engineers), Ltd., Thornbury, Bradford, England.* [Vol.71,p.79E]

This variable speed gear gives any speed from zero to 1,000 r.p.m. and above with reverse. It forms a unit, self-contained on a combination baseplate. Ball bearings are fitted throughout and means of lubrication provided for the gearing and all bearing surfaces.

The standard arrangement consists of the firm's variable-speed gear coupled through its variable-speed shaft to a final variable-speed shaft by an infinitely-variable speed unit. The latter is in effect a differential or concentric gear coupling, the sun pinion of which is keyed to the variable shaft of the standard variable-speed gear, the planetary pinions



being mounted on a spider driven at a constant speed by either gear or chain drive from the constant-speed shaft of the standard variable-speed gear. The internal spur gear ring of the infinitely variable unit, which is driven by the planetary pinions, is fitted into a housing that is keyed to and drives the final variable-speed shaft.

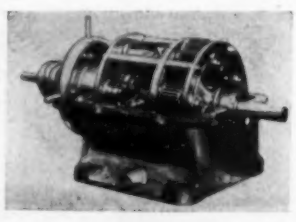
The unit is driven by belt, chain, or gear from the prime mover, or by electric motor. Varying speeds are obtained by operating cones of standard variable-speed gear in the usual manner by means of a hand or chain wheel.

## — 82 —

### Speed Changer, Infinitely Variable

*Aldwych Engineering Co., Ltd., Astor House, London, W.C., England.* [Vol.71,p.101E]

This infinitely variable-speed change gear is designed mainly for the transmission of power in workshops and for general industrial purposes. The design is estimated to be suitable for transmitting loads up to 1,000 in. lb. on the output shaft, delivering approximately



9 hp. with a motor input speed of 1,400 r.p.m. Under test, a gearbox transmitted 6 hp. with a mechanical efficiency of 85 per cent. A maximum efficiency of 92 per cent is obtainable, however. The gear is designed to give any speed between zero and one-third the speed of the input shaft. Speed changes are made smoothly and silently by merely turning a pilot handwheel.

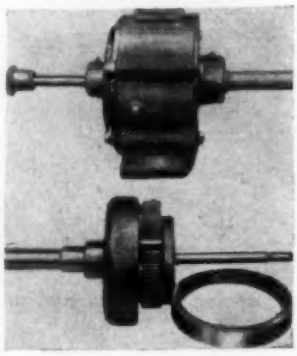
The input shaft carries an internal eccentric shaft, which has longitudinal movement to vary the throw of three eccentrics. One of these eccentrics is for driving and the other two for balancing. The driving eccentric carries five connecting rods, each of which actuates a crank that, in turn, drives a planetary pinion. On the forward stroke of a crank, a clutch engages the planetary pinion but slips on the return of the crank.

## — 83 —

### Speed Changers, Planetary-Type

*Moss Gear Co., Ltd., Birmingham, England.* [Vol.71,p.169E]

The driving gears and pinions are of alloy steel and the pinions are mounted on ball or roller bearings. The internal gears are cut from forged blanks and the driving shafts are of heat-treated alloy steel. The driving gear and planetary pinions are totally inclosed in



oil- and dust-proof cases, the input and output shafts being in line. Shock-absorbing mechanisms can be fitted.

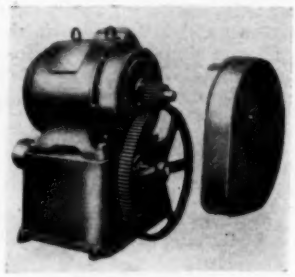
The speed changers are used for both speed increasing and reducing. They are suitable for transmitting up to 40 hp. with ratios up to 100 to 1. For a 60 to 1 reduction an efficiency of 95 per cent is claimed.

## — 84 —

### Speed Reducers, Standardized

*Crofts (Engineers), Ltd., Thornbury, Bradford, England.* [Vol.70,p.216E]

Bases in five sizes to suit practically all makes and types of motors and complete motor drives to transmit up to 50 hp., with speed reductions up to 7 to 1, can be obtained readily. The drive may be by inverted-tooth chain, V-rope, or spur gearing, the pinions being of Fabroil with a cast-iron wheel. The standard practice is to transmit through silent chains for speed ratios up to 3 to 1



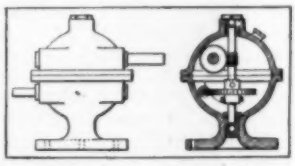
and through spur gearing for higher ratios. If desired, the firm's "Sure-Grip" V-rope drive may be applied for ratios up to 4 to 1. Ball bearings are applied to the low-speed shaft.

## — 85 —

### Speed Reducer, Double-Reduction

*C. Campart, 32 Theobald's Road, London, W.C., England.* [Vol.71,p.23E]

Six types of this R.V.R. speed reducer are available, in speed reductions from 1 to 8, to 1 to 2,400. The double-reduction gear consists of two worm gears inclosed in a case.



The worms are of hardened steel, ground, and the wheels are of phospor-bronze. Each shaft revolves in two bearings with forced lubrication, end pressures being taken by ball bearings.

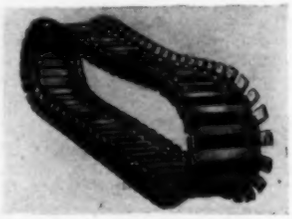
The gear case is of aluminum, oil-tight. As the upper half of the gear case can be turned to any position on the lower part, the low-speed shaft can be arranged in any position. Reduction gears of this type are available in sizes from 1/50 to ¾ hp. Single reduction gears are also available in a range of sizes.

## — 86 —

### Belts, Duralumin-Lag

*Crofts (Engineers), Ltd., Thornbury, Bradford, England.* [Vol.71,p.181E]

In connection with its variable speed gears employing belts and expanding and contracting pulleys, this firm is now applying Duralumin lags in place of wood lags on the belt where high speeds are desired. The belt is lighter than the ordinary



wood lag belt and, besides being stronger, runs quietly at all speeds. It resists corrosive atmospheres and can be used for the direct coupling of motors at 1,000 rev. per minute.

The belt is of rubber-impregnated fabric and the lags are secured to it in two rows, upper and lower, with the belt central between them, the joints being made by Duralumin rivets.

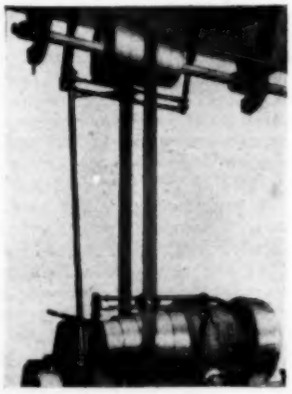
## — 87 —

### Belt Shifter for Cone Pulleys

*O. N. Beck, 11 Queen Victoria St., London, E.C., England.* [Vol.70,p.305E]

By means of this belt shifter for cone pulleys, a belt can be shifted in two seconds, it is claimed. A positive movement for the belt is provided both at the top and bottom pulley, the belt fork or guide sliding along rods to the position desired. The shifter can be fixed to suit any position of the belt and the device is easily attached to the ceiling or the machine.

The shifter is available in seven sizes for countershafts, and is suitable for four-step cone pulleys with steps ranging up to 6½ in. wide and in six sizes for cone pulleys on the machine itself with steps up to



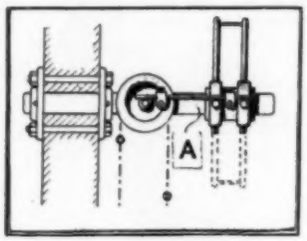
6 in wide. Manipulation of this appliance is effected from the front of the machine.

## — 88 —

### Belt Shifters

*Henry Lindsay, 47 Queen's Road, Bradford, England.* [Vol. 71,p.168E]

This dead-locking, belt-shifting gear is of simple design, consisting of a plain fixed bar of rectangular section on which the belt forks slide when moved by a crankpin, which is secured to a chain- or rope-wheel. A rod connects the crankpin with a pin on the casting to which the belt fork is secured. The distance between the rods forming the fork is adjustable according to the width of the belt. These forks may be inverted. The distance from the chain




wheel to the belt fork is adjustable.

This belt-shifting gear is available in nine sizes, to suit belts from 2 to 14 in. wide.

## — 89 —

### Coupling, Flexible, Carrier-Ring

*Power Plant Co., Ltd., West Drayton, Middlesex, England.* [Vol.71,p.131E]

The special feature of this coupling is the central carrier ring, which consists of three driving members and two cover

flanges. The carrier ring takes the form of a spider, the sides of which engage with the driving and driven members. Its construction provides a medium whereby complete flexibility is obtained.

The spider consists of a steel ring which carries flat springs set around its circumference. Each spring is set centrally, thus forming two cantilevers. Each cantilever under load deflects in parabolic form.

Angular discrepancy is permitted by the spherical seating for the carrier ring, formed by the end of the right-hand driver. Axial movement of the shafts is also provided for. End movement can take place within the limits of the cover flanges and the halves abutting the carrier ring. All working surfaces are lubricated automatically by grease under pressure.

Fifteen standard sizes are available, the smallest having overall dimensions of 6½ in. diam. by 3½ in. long, the largest being 44 in. in diam. by 27½ in. long. The smallest has a bore of 1⅜ in. and the largest, 21 in. Weight, variable from 19 to 5,200 pounds.

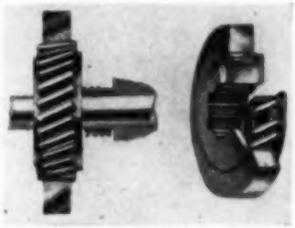
## — 90 —

### Clutch, Unidirectional

*Humfrey-Sandberg (Sales), Ltd., Smith Square, London, S.W., England.* [Vol.71,p.146E]

The clutch consists essentially of three members, namely, outer and inner rings, and a set of rollers running between them. The spring does not form part of the clutch. The device may be likened to an ordinary roller bearing with the difference that it rotates freely in one direction and locks instantaneously in the other.

A separator ring and side



plates retain the rollers in their respective positions. The unidirectional drive is a result of the special form of the tracks of the inner and outer members, and to the fact that the rollers, which are of ordinary cylindrical type, are disposed at an angle to the axis of rotation of the clutch. In shape, the tracks are conoidal and they are of such curvature that line contact is made along the full length of the rollers. The spring holds the rollers against the track to obtain undirectional drive.

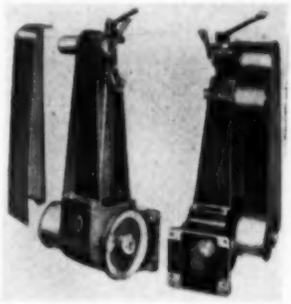
## — 91 —

### Drive Units for Cone Pulleys, Motor

*George H. Alexander Machinery, Ltd., Birmingham, England.* [Vol.70,p.281E]

Ludwig Loewe & Co., Berlin, manufacture this drive, consisting of a self-contained flange motor with the gearbox acutating a belt to drive the main spindle. It is for application to lathes and milling machines.

At the lower end of the unit is a gearbox, which is bolted to the back leg of the machine under the headstock, this gearbox carrying a vertical frame with two guide pulleys running in ball bearings. Outside the box is a flanged pulley driving a wide belt, which in turn drives



a plain pulley that takes the place of the cone pulley. Belt tensioning means are provided.

The gearbox gives three speeds, controlled by a handle at the top. A sheet-metal guard protects the belt drive.

# *Miscellaneous Equipment and Supplies*

## — 92 —

### Furnaces, Electric

*Wild-Barfield Electric Furnaces, Ltd., Holloway, London, N., England.* [Vol.71,p.61E]

These furnaces are standard works types, the control panels being self-contained floor units and the controls, with the exception of the magnetic indicator, placed behind the panels. Two vertical furnaces have ben developed, one with an output of 2½ tons of steel parts, and the other with an output of

1¾ tons of steel parts in 47 hours. The horizontal furnace has an output of 3½ tons in a similar period of time.

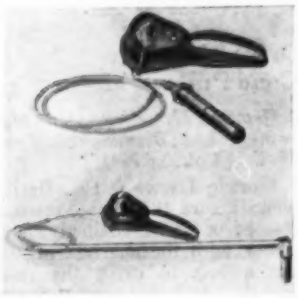
For carburizing and annealing, the furnace can be fitted with automatic temperature control. The power consumption is 20 kilowatts.

## — 93 —

### Pyrometers, Surface, for Molds

*Cambridge Instrument Co., Ltd., 45 Grosvenor Place, London, S.W., England.* [Vol.71, p.155E]

These surface pyrometers are for determining quickly the inside surface temperatures of Bakelite and other molds, and of heated surfaces of mold presses. Each instrument comprises a sensitive thermo-element connected by a short, flexible, steel-armored leads to a portable indicator calibrated to read directly in degrees of temperature. The thermo-element



is protected by a cylindrical metal sheath which, when the thermo-couple is applied to the hot surface, is forced back against a spring to bring the end of the loop into contact with the surface.

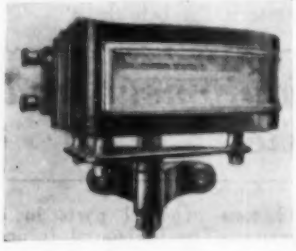
— 94 —

### Pyrometers, Thermo-Electric and Optical

*Siemens Bros. & Co., Ltd., Woolwich, S.E., England.* [Vol. 71,p.132E]

The thermo-electric pyrometer consists of an indicator, a pyrometer stem, and a compensating cable. The indicators are in two types, the precision and the base metal. They have moving coils, with high internal resistance so that variations in the resistance of the thermo-couple and connecting leads have little effect on the readings.

All precision indicators are suitable for use with platinum,



platinum-rhodium, or base-metal thermo-couples, and the standard range of temperatures is from 500 to 1,400 deg. C., depending upon the kind of thermo-couple used. The base-metal indicators are intended for use only with base-metal thermo-couples, and will measure temperatures up to 1,200 deg. C. with an appropriate couple.

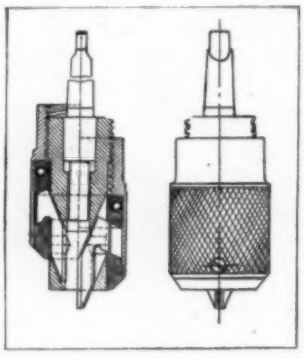
The optical pyrometer employs a standardized electric lamp, against which the brightness of the object is compared.

— 95 —

### Chuck, Drill, Automatic

*Transporting Machinery & Engineering Co., Ltd., 76 Victoria St., Westminster, S.W., England.* [Vol.71,p.181E]

Four sizes of this simple automatic drill chuck are manufactured. The chuck consists of the body, the knurled shell, the jaws, a ball bearing, and two rings. The body carries three jaws, the slots providing inclined seatings for the top and bottom faces of the jaws. The upper part of the body has a quick-pitch, left-hand thread engaged by an internal thread on the knurled outer shell. This provides the means for opening and closing the chuck by the relative axial movement of the body and outer shell. The jaws slide in the body and each has an inclined projecting part en-



circled by the upper and lower driving rings, a ball bearing taking the thrust of the upper ring. The lower driving ring is fixed to the outer shell by three screws.

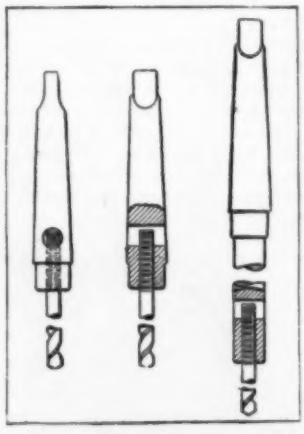
The smallest chuck takes drills from 1/50 to 23/100 in. in diameter, has a body diameter of 1⅛ in. and weighs ½ lb. The largest chuck takes drills from 3/25 in. to 59/100 in. in diameter and has a body diameter of 2⅛ in., and weighs 2¼ pounds.

— 96 —

### Die Shank, Detachable, for Twist Drills

*Leadbeater & Scott, Ltd., Penistone Road, Sheffield, England.* [Vol.71,p.182E]

This improved detachable die shank is intended for holding and driving small straight-shank twist drills. The die shank has at the lower end a hardened



threading die, which will cut a thread on a straight-shank twist drill and thus hold it securely under the maximum drilling stress. When the drill becomes unfit for further service, it may be removed with ease and another inserted, thus saving the cost of a new shank.

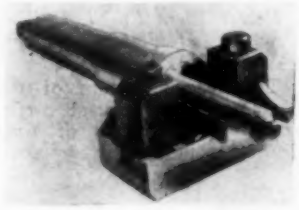
A fully-threaded die is provided at the rear of the hole, the front part of the bore being enlarged to suit the size of straight-shank drill for which it is intended. Shanks of this type are available in a number of sizes suitable for drills of $\frac{1}{16}$ in. to $\frac{11}{16}$ in. in diameter.

— 97 —

### Trepanning Tool, Adjustable

*Loranco, Ltd., 65A Fenchurch St., London, E.C., England.* [Vol.70,p.242E]

With a single tool, a wide variation in diameters is possible. The body of the tool is attached to a taper shank that fits the machine spindle, and the other end of the shank carries the pilot. The body has a transverse V-groove, in which the trepanning cutter holders are adjusted to and from the center. The cutters are of 18 per cent



tungsten steel and it is claimed that a 6-in. hole can be cut in 1-in. boiler plate in 80 seconds.

The tool is made in five standard sizes, covering diameters ranging from $1\frac{9}{16}$ to $11\frac{3}{4}$ in. and the depth of trepanning by a single cut varies from $1\frac{9}{16}$ to 4 in. The cutters are ground to split the work into a roughing and finishing cut. The pilot is spring-controlled.

— 98 —

### Clamps, Lifting, Positive, "Virex"

*Weldless Chains, Ltd., Gartsherrie, Coatbridge, England.* [Vol.71,p.130E]

The "Virex" clamp is designed for light or heavy lifting and may be used for stacking steel plates. The clamp consists mainly of four members, namely, the fixed jaw, two links,

and the cam jaw. Upward pull on the shackle pin lifts the side link, resulting in a swivel movement of the cam jaw.

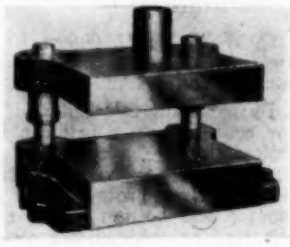
The clamp is made in five standard sizes, although larger sizes with wider gaps can be furnished when required. A special inclosed type is also made. The standard sizes range from ½-ton maximum capacity for ¼- to ⅜-in. plates to 10-ton capacity for plates from 1¼- to 2½-in. thick.

— 99 —

### Die Sets, Standardized

*Desoutter Bros., Ltd., The Hyde, Hendon, N. W., England.* [Vol.71,p.80E]

These standardized die sets are available in eleven sizes from stock, the smallest providing a die space 4 in. long by 3 in. wide and the largest, 16 in. long by 12 in. wide. The shank is



made to customers' requirements, all locating faces being ground. The horizontal faces of the base and punch holder are ground in strict relation to ensure parallelism and in addition, the front vertical faces are ground flat and square with their respective horizontal faces. The guide pillars are hardened and ground, the bushings being hardened, ground, and lapped.

The width of the slot and the thickness of the lug in the base are also standardized, so that holding-down bolt diameters and lengths may be made uniform. The various components are stocked. All punch holders and die bores of any given size are interchangeable.

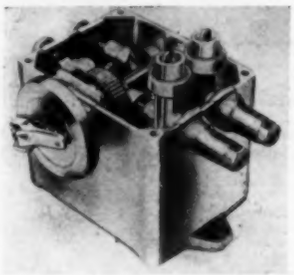
A range of plain die sets is made, these having ground parallel horizontal faces only. They are of standard light and heavy patterns and there are ten sizes, the die spaces ranging from 4 in. long by 3 in. wide to 16 in. long by 12 in. wide.

— 100 —

### Lubricator, Sight-Feed, Automatic

*Eclipse Automatic Devices, Ltd., 173 Great Portland St., London, W., England.* [Vol.71, p.133E]

A two-feed lubricator is shown, the outer case containing two complete pumping units. The main body of a unit is bored to receive the two pumping plungers and also forms a guide for a sliding member, which is actuated by the driving cam,



the latter rotating against the inner sides of a shoe. The two plungers are connected by links. They are operated by the sliding member.

Each pumping unit is easily inserted or removed from the outer case without the use of tools. A separate cam is required to operate each pumping unit and the cams are carried on a central shaft.

The lubricator can be supplied with up to ten pumping units and the capacities are from 4 to 22 pints.

## — 101 —

### Marking-Off Apparatus, Magnetic

*E. H. Jones (Machine Tools) Ltd., Baldwin Terrace, London, N., England.* [Vol.71,p.90E]

This magnetic marking-off apparatus will hold iron and steel articles by means of a rectangular plate 18x8½ in., the plate being magnetized at 110 or 220 volts. The power taken is 50 watts and the holding capacity is 65 lb. The unit is claimed to be suitable for checking and marking off rough castings, partly machined parts, and complete mechanisms.

The large wheel can be set to fractions of a degree by a pointer and vernier scale. The work-holding plate turns on a horizontal spindle and can be

swiveled 180 deg. in the horizontal plane, an index pin giving dividing to 15 degrees.

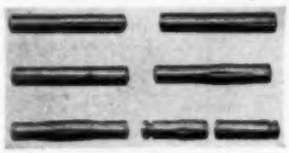
Net weight, 140 pounds.

## — 102 —

### Pins, Grooved

*Exors. of James Mills, Ltd., Bradbury, near Stockport, England.* [Vol.71,p.45E]

These pins will fit in parallel holes calling for no reaming and are cheaper than threading. It is claimed that they are not loosened by vibration. Referring to the top line, the first example is of a full-length taper grooved pin that replaces the ordinary pin, but does not require a reamed hole. The other example is a half-length taper grooved pin that may be used, for instance, in place of a grub screw to secure a key in place or position. At the left of the middle line is a full-length, parallel-grooved pin replacing



parallel pins and rivets and giving a forced fit over its full length. The example on the right is a half-length, reversed-taper grooved pin which is a variant on the example immediately above it, and it may be used in blind holes. At the bottom line on the left is shown a center-grooved pin.

## — 103 —

### Speed Indicator, Electrical

*F. A. Wilkinson & Partners, Ltd., Hatfield, Herts, England.* [Vol.71,p.34E]

Speeds of shafts and spindles can be determined by means of this electrical device, consisting essentially of a small dynamo directly connected electrically to a dead-beat instrument, which shows the speed in r.p.m. The dynamo is driven by a round belt or is directly connected to

the device, the speed of which is to be measured.

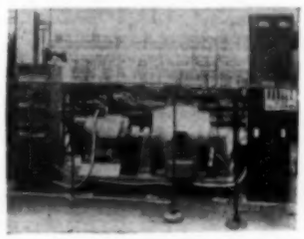
The instrument is small, the body of the dynamo being only 2½ in. wide. The accuracy of speed measurement is within 3 per cent, it is claimed.

## — 104 —

### Testing Set for Motor-Driven Machines

*Alfred Herbert, Ltd., Coventry, England.* [Vol.70,p.303E]

By means of this testing set for use on a.c. circuits, a customer's machine can be tested under working conditions, using its own switchgear. This is obviously better practice than testing these separately, and as-



suming that they will work together satisfactorily. The set is of the motor-driven alternator type.

# INDEX OF MANUFACTURERS

**European Edition**


— A —

| | No. | Page |
|---|---|---|
| **Aubacas Engineering Co., Ltd.,** Liverpool, England | | |
| Pneumatic-hydraulic riveter | 68 | 161 |
| **Ackworthie, Ltd., John,** Coleshill St., Birmingham, England | | |
| Automatic nut-castellating machine | 72 | 162 |
| Special nut turning machine | 75 | 163 |
| **Aerostyle, Ltd.,** 176 St. John St., London, E. C., England | | |
| Automatic paint-spraying machine | 73 | 162 |
| **Aldwych Engineering Co., Ltd.,** Astor House, London, W. C., England | | |
| Infinitely variable speed changer | 82 | 164 |
| **Alexander Machinery, Ltd., G. H.,** Birmingham, England | | |
| Plunge-cut electric-hydraulic grinder | 17 | 152 |
| Precision lathe, 8-inch | 29 | 155 |
| Drive units for cone-pulley motors | 91 | 165 |
| **Asquith, Ltd., W.,** Halifax, England | | |
| Horizontal drilling machine, 4-inch spindle | 5 | 159 |

— A —

(*Continued*)

| | No. | Page |
|---|---|---|
| Duplex horizontal drilling machine | 6 | 159 |
| Solebar-pattern drilling machine | 13 | 152 |
| **Avery, Ltd., W. & T.,** Soho, Birmingham, England | | |
| Sheet-metal ductility testing machine | 78 | 163 |

— B —

| | | |
|---|---|---|
| **Beck, O. N.,** 11 Queen Victoria St., London, E. C., England | | |
| Belt shifter for cone pulleys | 87 | 165 |
| **Benrath Machine Tools,** John Dalton St., Manchester, England | | |
| Slot milling machines | 43 | 157 |
| **Brett's Patent Lifter Co., Ltd.,** Foleshill Works, Coventry, England | | |
| Self-contained drop hammer, 3-cwt. | 66 | 161 |
| **Butler Machine Tool Co., Ltd.,** Halifax, England | | |
| Punching and slotting machine, 48-inch stroke | 55 | 159 |

— C —

| | No. | Page |
|---|---|---|
| **Cambridge Instrument Co., Ltd.,** 45 Grosvenor Place, London, S. W., England | | |
| Surface pyrometers for molds | 93 | 165 |
| **Campart, C.,** 32 Theobald's Road, London, W. C., England | | |
| Double-reduction speed reducer | 85 | 164 |
| **Campbells & Hunter, Ltd.,** Leeds, England | | |
| Turbine boring machine | 2 | 149 |
| **Craven Bros. (Manchester), Ltd.,** Reddish, Stockport, England | | |
| Vertical and horizontal planer-milling machine | 47 | 158 |
| Self-contained wall-type horizontal and vertical planer | 48 | 158 |
| **Crofts (Engineers) Ltd.,** Thornbury, Bradford, England | | |
| Infinitely variable speed changer | 81 | 164 |
| Standardized speed reducers | 84 | 164 |
| Duralumin-lag belts | 86 | 164 |

— D —

| | | |
|---|---|---|
| **Desoutter Bros., Ltd.,** The Hyde, Hendon, N. W., England | | |
| Standardized die sets | 99 | 166 |

## E


**Eclipse Automatic Devices, Ltd.**, 173 Great Portland St., London, W., England
Automatic sight-feed lubricator. 100 166

**Exors. of James Mills, Ltd.**, Bradbury, near Stockport, England
Grooved pins ..... 102 167


## F


**Fletcher Bros.**, Halifax, England
Improved shaper, 18 to 20-inch stroke ..... 51 159


## G


**Godfrey Engineering Co., Ltd.**, Wood Green, London, N., England
Improved universal oxygen-jet cutting machine ..... 62 161

**Greenwood & Batley, Ltd.**, Leeds, England
Hydraulic testing machine, 500-ton ..... 79 163


## H


**Herbert, Ltd., Alfred**, Coventry, England
Line reaming machine ..... 7 150
Vertical drilling machine ..... 14 152
Horizontal surface grinder with rotary table ..... 18 153
Rotary table surface grinder ... 20 153
Precision screw thread grinder .. 21 153
Automatic tapping machine for pipe unions ..... 70 162
Testing set for motor-driven machines ..... 104

**Holroyd & Co., Ltd., J.**, Milnrow, near Rochdale, England
Re-truing and burnishing axle journal lathe ..... 36 156
Improved profile milling machine 45 158
Special production spur-gear hobber ..... 67 161

**Howden & Co., T. C.**, Birmingham, England
Tube testing machine, 50-ton .. 76 163

**Hulse & Co., Ltd.**, Manchester, England
Horizontal boring machine, 4-inch spindle ..... 1 149
Center lathe, 18- and 24-inch .. 27 154

**Humfrey-Sandberg (Sales), Ltd.**, Smith Square, London, S. W., England
Unidirectional clutch ..... 90 165


## J


**Jones (Machine Tools), Ltd., E. H.**, Islington, N., England
Radial drilling machine ..... 8 151
Double-column drilling machine with triple table ..... 11 151
Standard center lathe ..... 30 155
Duplex milling machine ..... 39 156
Manufacturing milling machine. 40 157
Magnetic marking-off apparatus. 101 167

**Jones, Ltd., S. G.**, Brixton Road, S. W., England
Vertical sensitive drilling machine ..... 10 151
Twist drill grinder ..... 22 153

**Jones & Shipman, Ltd.**, Leicester, England
Two-spindle horizontal drilling machine ..... 4 150


## K


**Kellenberger & Co., L.**, St. Gallen, Switzerland
Crankshaft-repair grinders .... 26 154


## L


**Leadbeater & Scott, Ltd.**, Penistone Road, Sheffield, England
Detachable die shank for twist drills ..... 96 166


## L (Continued)


**Lindsay, Henry**, 47 Queens Road, Bradford, England
Belt shifters ..... 88 165

**Loranco, Henry**, 65a Fenchurch St., London, E. C., England
Automatic tapping machines ... 69 162
Adjustable trepanning tool ..... 97 166


## M


**Milnes, Henry**, Bradford, England
Precision center lathe, 4-inch .. 31 155

**Moss Gear Co., Ltd.**, Birmingham, England
Planetary-type speed changers .. 83 164


## O


**Oldfield & Schofield Co., Ltd.**, Boothtown, Halifax, England
Power-driven straightening press, 10-ton ..... 54 159

**Ormerod's Tool Co., Ltd.**, Hebden Bridge, England
Heavy-duty traversing-head shaper ..... 50 159


## P


**Parkinson & Son, J.**, Shipley, England
Twin-overarm plain milling machine ..... 42 157

**Pels & Co., Ltd., Henry**, Osnaburgh St., London, N. W., England
Open-ended bar shears ..... 58 160
Punch and plate-splitting shears 59 160

**Power Plant Co., Ltd.**, West Drayton, Middlesex, England
Carrier-ring flexible coupling ... 89 165

**Premier Steel Tube Co., Ltd.**, 15-19 Kingsway, London, W. C., England
Autogenous torch cutting machine ..... 63 161


## R


**Rapid Magnetting Machine Co., Ltd.**, Birmingham, England
Electro-magnetic separator for chips ..... 74 163

**Redman & Sons, Ltd., C.**, Halifax, England
Surfacing and boring lathe, 40-inch ..... 32 155
Improved chucking lathes, 24-inch ..... 34 155


## S


**Scott Bros. (Halifax), Ltd.**, Halifax, England
Improved guillotine shears ..... 57 160
Plate-bending machine ..... 61 160

**Selson Engineering Co., Ltd.**, Hatton Garden, E. C., England
Plain grinder, 80x12-inch ..... 16 152
Rotary surface grinder ..... 19 153
Automatic cutter-head grinder .. 23 154
Improved spline grinder ..... 25 154
Plate-splitting shearing machine 60 160

**Siemens Bros. & Co., Ltd.**, Woolwich, S. E., England
Thermo-electric and optical pyrometers ..... 94 166

**Song Machine Tools, Ltd.**, Horseferry Road, London, S. W., England
Four-motor radial drilling machine ..... 9 151
Semi-automatic multiple-spindle vertical drilling and countersinking machine ..... 15 152
Universal tool and cutter grinder 24 154
Single-arm automatic eccentric press ..... 52 159


## S (Continued)


**Stanley Machine Tool Co., Ltd.**, Halifax, England
Center break lathe, 12½-inch ... 28 154
All-geared capstan lathe, 7-inch 35 156

**Steinle, Ltd., Leo C.**, Marsham St., Westminster, S. W., England
Straightening press ..... 53 159

**Stone & Co., Ltd., J. B.**, Finsbury Pavement, London, E. C., England
Bench type small nibbling machine, No. 0 ..... 56 160

**Sulzer Bros.**, Bedford Square, London, W. C., England
Gear testing machine ..... 77 163

**Swift & Sons, Ltd., G.**, Halifax, England
Surfacing and boring lathe, 30-inch ..... 33 155


## T


**Transporting Machinery & Engineering Co., Ltd.**, 76 Victoria St., Westminster, S. W., England
Automatic drill chuck ..... 95 166


## U


**United Machine Tool Co., Ltd.**, Gray's Inn Road, London, W. C., England
Vertical and horizontal milling machine ..... 44 157


## V


**Variable Power Transmissions, Ltd.**, Britannia Works, Bassein Park Road, Shepherd's Bush, W., England
"Varatio" speed changer ..... 80 164


## W


**Wadkin & Co.**, Leicester, England
Boring machine for pattern makers ..... 71 162

**Wanderer-Werke, A. G.**, Schonau-Chemnitz, Germany
Manufacturing duplex milling machine ..... 38 156
Plain milling machine ..... 41 157

**Ward, Haggas & Smith**, Keighley, England
Wheel lathe, 43-inch ..... 37 156

**Weldless Chains, Ltd.**, Gartsherrie, Coatbridge, England
"Virex" positive lifting clamps .. 98 166

**White Machine Tool Co., Ltd.**, Halifax, England
Laundry-machine bed planer .. 46 158
Screw-driven planer ..... 49 158

**Wickman, Ltd., A. C.**, Coventry, England
Six-spindle automatic screw machine ..... 3 149
Hydraulic multiple-spindle drilling machine ..... 12 151

**Wild-Barfield Electric Furnaces, Ltd.**, Holloway, London, N., England
Electric furnaces ..... 92 165

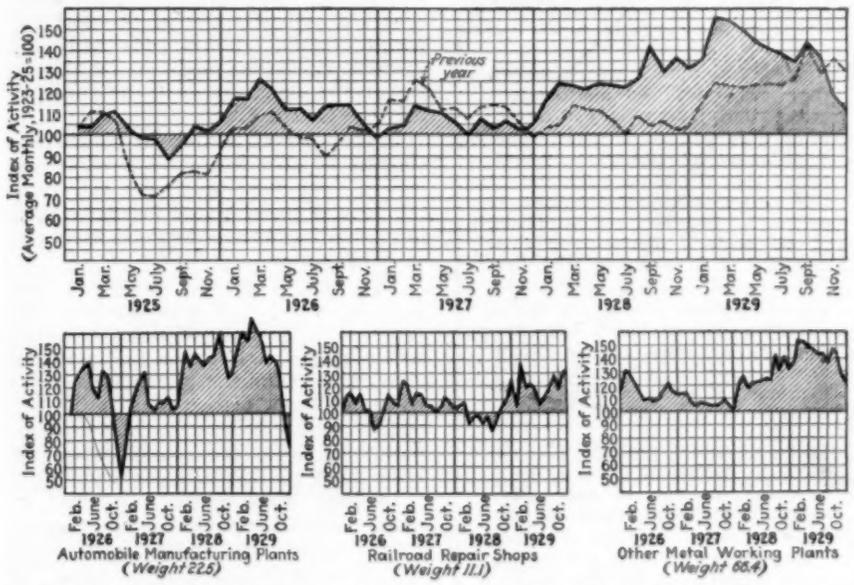
**Wilkinson & Partners, Ltd., F. A.**, Hatfield, Herts, England
Electrical speed indicator ..... 103 167

**Wolf & Co., Ltd., S.**, 115 Southwark St., London, S. E., England
Flexible-shaft electric filing machine ..... 64 161
Flexible-shaft filing and polishing machine ..... 65 161

# NEWS
## OF THE WEEK

## *Industrial Activity Satisfactory Despite Seasonal Lull*

THAT the volume of operations in the metal-working industry as a whole during December was only slightly below that of November is indicated by preliminary data received by *Electrical World* on the consumption of electrical energy by a large number of these plants scattered throughout the country. The December rate of activity in the metal-working industry as a whole, after corrections are made for the number of working days, was 4.6 per cent less than that of November, and 15.2 per cent less than that of December, 1928. Reports of operations since the opening of the year indicate, however, that the low point in rate of operations was reached in December, and that January operations will be materially increased in practically all branches of the metal-working industry.




The automobile manufacturing industry, including the manufacture of parts and accessories, reported a decrease in the rate of operations during December of 15.1 per cent, as compared with that of November, and 42.4 per cent as compared with that of December, 1928. It seems probable that the low point of operations in this industry occurred in December, and that January operations will be higher.

Other branches of the metal-working industry present a more favorable picture. The December rate of operations outside the automobile plants and railroad repair shops was 5.1 per cent less than that of November and 11 per cent less than that of December, 1928. The December, 1929, operations, however, were still 11.3 per cent greater than those of December, 1927.

Activity in the railroad repair shops during December was 1.7 per cent greater than that of November, and 15.8 per cent greater than that of December, 1928.

* * *

## American Auto Exports Show 23 Per Cent Gain

During the year just closed, 1,015,000 American motor vehicles were sold outside of the United States, with a total value of $767,400,000. This represents a 23 per cent increase in foreign sales over those of 1928. During the year, 5,651,000 cars and trucks were produced in the United States and Canada, 4,846,000 of them being cars and 805,000 being trucks. Of the number of cars purchased, 87 per cent were of the closed type.

* * *

## S.A.E. Prepares for Annual Meeting

All preparations for the annual meeting of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, on Jan. 20-24, have been completed, including those for the annual business meeting at 8 o'clock on Monday, Jan. 20. As it is now planned, the meeting will open with registration on Monday, Jan. 20, at 10 a.m. The first of the sessions will be held at 2 o'clock that afternoon, the various sessions continuing until the final one on Friday, Jan. 24. Papers on the economics of production, effective design on engine acceleration, the metalclad airship, high pressure bearing research, downdraft carburetion, relation of foundry practice to engineering, Tungsten-carbide metal in production, what 1930 offers to the motor industry, lightweight Diesel engines, body mountings, sheet metal and its fabrication for automobile bodies, and several papers on the front-wheel drive will be presented during the sessions.

* * *

## Mechanics Congress Planned by Belgians

An International Congress of General Mechanics, under the patronage of His Majesty, the King of the Belgians, will be held in Liege, Belgium, from Aug. 31 to Sept. 6, 1930, on the occasion of the centenary of Belgian independence. This Congress was arranged with the idea of carrying on the pre-war Congresses of Mechanics Applied to Industry, which were held in Liege in 1905 and Dusseldorf in 1910. The Third Congress, which was to be held in London in 1915, was never held, and the arrangements for the present Congress are the result of a transfer of duties from the original committee. The endeavor of these congresses is to review the progress which has been realized in invention and the construction of general mechanical engineering machinery and apparatus, and to find fields for further research.

* * *

## Metal Exposition Plans To Be Sent Out March 1

Floor plans for the annual National Metal Exposition in Chicago will be sent out between Feb. 15 and Mar. 15. Consideration of the idea to utilize the Stevens Hotel exposition spaces with the consequent reduction in floor space available were held up following the announcement that the South Park Commission, controlling the amphitheater at Soldier's Field, has been awarded $800,000 to make proper alterations and arrangements to make the space under the seats available for exhibition purposes. The Show will be held the week of Sept. 22, and architects assure the Commission that the alterations will have been completed by Aug. 1 at the latest.

# BUSINESS · BAROMETER

## *Decline in the Value of Silver is the Only Unfavorable Factor in a Week of Better Business*

By THEODORE H. PRICE
*Editor, Commerce and Finance, New York*

EVER since the discovery of America, gold has been gradually displacing silver as a standard of value. In the process, many economic convulsions have occurred. The most notable was a result of the effort that William Jennings Bryan made to re-establish silver as the monetary standard of the United States. This attempt ended with McKinley's election in 1896, and since that time the gold standard has been adopted by all of Europe. Although the British government has recognized gold as the monetary standard in India, silver still continues to be used.

The world's population is now put at about 1,800,000,000. Of this total, it is estimated that one half, or 900,000,000, use silver as money, and will be very slow to give it up. Hence, the widespread apprehension that was caused last week by a decline which has carried silver down to the lowest price on record.

In Shanghai, which has become the most important oriental market for silver, the price of the Mexican dollar fell to 27.6 cents last week, and the concurrent quotation in New York for silver was 43⅞ cents an ounce, as compared with a previous low record of 46¼ cents an ounce, established in 1915 when the financial repercussions of the World War made everybody anxious to convert their property into gold.

The cause of the decline in the gold value of silver is a little obscure, but it is generally attributed to the demonetization of silver in India and the war in China, largely fought by the use of "silver bullets" in paying the troops and the commanding generals that have surrendered "for a consideration." These expenditures have brought "hoarded" silver on the market and into circulation. Of the facts no one can be certain, but it is obvious that the decline in silver means a serious impairment in the purchasing power of nearly one-half the world's population. In the long run, this impairment may be salutary, as it should lead to the establishment of a more stable standard of value, but the process of stabilization will be a painful one and it is much to be feared that its effect upon the world's trade will be depressing. This view of the case caused more or less apprehension in London and New York last week, and the episode furnishes an example of how difficult it is for even the most intelligent to forecast the financial and commercial future.

***From this page the reader will get a quick picture of current business and industry. The boxed material below is a summary of the letters from regional correspondents of the American Machinist, published in full on the opposite page.***

**STEADY business was reported from machinery and machine-tool centers during the week just closed, some reporting an increase, some a falling-off, but the majority indicating that the usual conditions at this time of the year are again in evidence. Inquiries are increasing in all centers, indicating a good quantity of business for the first quarter and creating considerable optimism among dealers and manufacturers generally. Deliveries continue to improve, and the 10 per cent shaper price increase is a harbinger of price changes in the offing.**

**CLEVELAND reports a quiet fortnight, with auto-parts concerns expected in the market. Milwaukee business for the week is as good as it was at this time last year; tractor concerns are buying. New England buyers are procrastinating, with orders leaning toward standard items. New York reports car-building and railroad supply orders and also a carload shipment of electrical tools to Soviet Russia. Cincinnati sales show a gain, demand being expected to continue increasing. Chicago expects a definite resumption of activity, partially because of preliminary lists from railway companies. Detroit conditions are getting better steadily, definitely improving conditions in nearby centers depending on the Detroit manufacturers for business. The situation throughout the country seems to be clearing up, dealers in all sections anticipating the release of the new budgets.**

The decline in silver has been in progress for some time, but it was ignored during the boom on the New York Stock Exchange, and it is only within the last ten days that it has commenced to attract general attention. Prior to that time the world was unwilling to consider anything that might be unfavorably construed, and although the decline in silver was frequently alluded to in these letters, it was disregarded. Its real significance is now appreciated, and it is probable that its effect may be over-estimated. Through the foreign exchange markets, the bankers of the world have it in their power to provide a shock-absorber for the changes that a shift from silver to gold in the Orient will bring about, and if the transition covers a sufficient period of time, the wealth-creating power of half the world's population ought to be able to absorb the depreciation in the currency that the Orient uses.

It is, however, a case in which psychology is more important than mathematics. We must wait for a change in the popular mood before people will believe that business is as good as it was expected to be.

The figures on car loadings, bank clearings, and similar examples, will reveal this in time, and then the public will wonder why it was so credulous about the optimistic predictions made when the stock market was at the top, and so willing to believe the pessimism that was going the rounds when the same stock market had declined.

In detail, there is not very much of importance or interest in the week's trade reports. The textile industry still continues to be depressed in tone, but there are some who believe that the cotton-mill owners are more anxious to fight the labor unions than they are to reduce the production of goods. The demand for steel is better, and copper is also easier to sell. Building materials are firmer, and the expectation of an active spring is becoming more general. The automobile show in New York has been jammed with visitors, and most of the dealers say they are booking more orders than they expected.

Taken in its larger aspects, the decline in silver is about the only unfavorable factor that was revealed last week. Sentimentally and historically, it is impressive, but the losses involved will be so slowly distributed over such an enormous economic area that it is to be doubted whether their effect will be felt unless we ourselves become supersensitive to the unfavorable. The avoidance of this supersensitiveness is now highly desirable, and the cultivation of an optimistic attitude toward the future is one of the pre-eminent duties of every business man who realizes that "there is nothing good or bad but thinking makes it so."

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# THE INDUSTRIAL REVIEW

## Weekly progress of the machinery and machine-tool business

THE following reports, gathered from the various machinery and machine-tool centers of the country, indicate the trend of business in these industries and what may be expected from the future:

### CLEVELAND

The first ten days of the new year were very quiet in the machine-tool trade. Dealers report sales as negligible and confined to small tools. Inquiries are below the average. This condition is expected to be short lived for as soon as inventories are completed and budgets for the year's requirements made up, a livelier condition will result. "Factory men" are visiting dealers in order to close up obstinate cases.

Releases of specifications by a number of automobile manufacturers to local auto parts concerns are expected to furnish a fair share of business for the tool trade in the near future. A number of shaper manufacturers have increased their prices ten per cent effective from January first. Construction of factory buildings showed a ten per cent gain in 1929 over 1928.

### MILWAUKEE

Manufacturers of machine tools report a flow of orders and inquiries since the holidays that is greater than the volume early in December and only slightly less than last year's figures. Many of the orders represented transactions which had been pending for considerable periods. Dealers report that January orders are coming in better than those in December and are for both special machines and standard items, but that the local demand does not appear to be as great as at the beginning of 1929. Manufacturers of grinding machines report improvement in deliveries has been affected more by improvement in production facilities than by the recent recession.

Tractor manufacturers have been buying heavily, but the Allis-Chalmers Manufacturing Co. list for the Monarch heavy-tractor plant at Springfield, Ill., has not yet been released. Lists from the manufacturers of dirt-moving machinery are also awaited. Demand from agricultural implement factories continues good, but automobile factories have not yet entered the market. A steady demand is noticeable from small shops for standard tools. The local employment situation in the metal trades on Jan. 1 showed a slight increase over the Dec. 1 figures, with increased hiring in automobile factories evident since the first of the year.

### NEW ENGLAND

New England's machinery and machine-tool field would indicate that buyers as a whole are procrastinating on requirements. A sizable inquiry volume has thus far not been fruitful of the usual percentage of orders, and business remains active only in comparison with the duller weeks of December. A spirited demand is not expected immediately.

Orders of early January seem to lean to standard machines almost entirely. Requirements for high-speed production units, on the other hand, are somewhat uncertain, which is also a true picture of the specialized machinery industry. An executive in this line is experiencing mounting costs, which may lead to higher prices for machinery from this highly competitive field.

There is no indication in this section of increased order volume from either the automobile or aeronautic manufacturers. The latter seems to have dropped negotiations for the present, while the automotive industry shows only a scattering of orders. Better business is certain from both sources; when, is problematical.

Orders for the week, while of comparatively small volume, were fairly representative of a widespread demand, but were rather restricted as to type of machine. Lathes, drills, and grinders predominated in orders noted. A Massachusetts metal-working plant bought a jig borer, a shaper, and a lathe.

### NEW YORK

Inquiries in the New York market are creating considerable optimism. Actual orders have not yet begun to bolster this feeling. The present market situation is as it has been for several weeks past, although better business is expected momentarily with the release of budgets and the beginning of the year's business. Dealers report the usual number of replacement and maintenance sales. One dealer reported an unusually good week, with several sales of large machines to a diversified field, including railroad supply and car-building companies.

General Electric is beginning to release inquiries for the smaller individual items of the year's business. Inquiries from other companies are for machines to be used in enlargement and rebuilding programs, and are more in the nature of requests for information preceding the determining the appropriation necessary for the expansion program. Most of the orders are expected within the first six months of the year, however. The week, conceded by machine-tool dealers to be the worst, as well as the first, year after year, because of its proximity to the holiday season, has been no more, or no less, than it was expected to be. The Black & Decker Manufacturing Co., Baltimore, sent a full carload of electrical tools to Soviet Russia during the week.

### PHILADELPHIA

Business in the machinery and machine-tool line eased off somewhat in the Philadelphia market during the last two weeks, inquiries dropping behind and orders being scattered.

The one bright spot in the period were sales to the Norfolk & Western Railroad and to the Southern Railway, both of which were in this market for new machinery. There was a falling off in the call for industrial equipment, and so far as reported, the automotive trade, the aircraft business, and radio manufacturers were not buying.

For the most part, optimism prevails. The view was expressed by some of the sales representatives and executives of the companies manufacturing machinery and machine tools that the business situation at the present time is somewhat ahead of what it was last year at this time, and there is basis for the belief that buying of industrial equipment will be resumed at an early date. Firms dealing in used machinery report a falling off in business, and repairs have not kept up.

### CINCINNATI

A number of the machine-tool manufacturers of the Cincinnati district report a slight gain in sales in the past week. With the majority, however, business remained at about the same level as in the previous week.

Sales of single tools and replacements to miscellaneous small users continued to be the sustaining feature of the week, but here and there was an order for two or three pieces of equipment. The buyers were well scattered over the country and their purchases were well diversified. Inquiries were numerous and of excellent tone, the major portion being from general machinists and miscellaneous users, located in all sections of the country. The majority were for single tools and replacements, but an increased percentage were for two or three items.

Selling agents report a continued fair demand from local and surrounding territory, with very little change from the previous week. Considerable new business is developing, it is stated, and prospects are regarded as bright for a general livening up of the market in this section.

### CHICAGO

From present indications and judging by the inquiries being received and by the closing of sales that have been held in abeyance during the holidays and inventory taking, the month will witness a definite resumption of activity in the machine-tool industry. From a number of sources come reports of manufacturing plants in the Middle West employing steel and iron working tools in their operations preparing to turn out their products on a scale of renewed activity. Initial lists of railroad shop equipment requirements, not looked for this early in the year, have been received within the last week. The largest of these is from the Atchison, Topeka, & Santa Fe, and numbers close to 20 tools, some of which are for heavy-duty uses. The Chicago, Rock Island, & Pacific comes next in volume, with the Chicago & Alton closely following. The receipt of these lists has had the effect of creating the belief among such concerns as specialize in railroad tools that railroad buying for the next three or four months will be much more active than had been anticipated. Industrialist inquiries are largely for automatic screw machines, millers, lathes, planers, shapers, and grinding machines. Demand for used tools is showing continued improvement, and dealers in this class of machinery look for a progressively increasing business for some weeks to come.

### DETROIT

The machinery and machine-tool business in the Detroit industrial area is still at a low ebb, but inquiries received during the past ten days or two weeks indicate that the situation is improving. Sales are no better than they have been for the past two months except in the case of a few dealers, but there is a definite change in the attitude of manufacturers.

It is the opinion of most of the outstanding dealers here that the automobile builders will be in the market for machinery and equipment of various kinds as soon as the results of the Auto Show have been gaged. Already, the influence of the show has been felt in many quarters and the impression here is that February, March, and April will witness a revival of general business and a noticeable improvement in the machinery and machine-tool business.

Several cities in Michigan have already begun to go forward after a long period of depression and a number of plants are either buying machinery or are making plans to do so in the near future. Monroe, Jackson, and Lansing are all picking up.

# Personals

A. R. ERSKINE, president of the Studebaker Corporation, South Bend, Ind., was elected president of the Pierce-Arrow Motor Car Co., Detroit, to succeed M. E. FORBES, at a special meeting of the board of directors of the latter organization recently. WALTER P. COOKE, Buffalo, was elected a director to succeed Mr. Forbes.

GEORGE GEDDES, formerly assistant manager of the Maine district for the United Shoe Machinery Corporation, Boston, Mass., has been made district manager, with headquarters at Lewiston, Me. He succeeds H. S. CANN, who died two months ago. DINSMORE BUNKER has been made assistant manager for the Maine district.

HUGO BILGRAM, president and owner of the Bilgram Machine Works, Inc., 1217-1235 Spring St., Philadelphia, Pa., celebrated his 83d birthday on Jan. 13. Mr. Bilgram is known all over the world for his inventions on gear-cutting machines and his gear-cutting researches.

E. R. WEBER, formerly assistant chief engineer of the R. D. Nuttall division of the Westinghouse Electric & Manufacturing Co., East Pittsburgh, has resigned to become chief engineer of the Thomas Spacing Machine Co., Pittsburgh.

DR. ELMER A. SPERRY, past president of the A.S.M.E., has been elected an honorary member of the Engineering Association of Hawaii. He was elected a life member during his visit to the island recently while returning from the World Engineering Congress.

A. M. GYDESEN, works manager of the Derby plant of the Harris-Seybold-Potter Co., Cleveland, Ohio, has resigned his position, according to an announcement by H. B. BLY, general works manager.

EUGENE E. WILSON has been elected president of the Standard Steel Propellor Corporation, Homestead, Pa., succeeding HARRY A. KRAELING, who will remain a director.

A. M. SARGENT, formerly vice-president in charge of engineering of the QC Engineering & Tool Sales, Inc., Detroit, has accepted the position of general manager of the Michigan Machine Co., 2281 West Fort St., Detroit.

WILLIAM R. BECK has become sales engineer for the Fort Pitt Steel Casting Co., McKeesport, Pa. He is a graduate of the Case School of Applied Science.

MARVEL W. DALLAS has been appointed advertising director of E. C. Atkins & Co., Inc., Indianapolis, Ind., succeeding T. A. CARROLL, who died recently.

H. K. PORTER has been made general sales manager of the Hyatt Roller Bearing Co., Harrison, N. J., a division of the General Motors Corporation.

E. E. MARRESFORD has become affiliated with the sales staff of the Watson-Stillman Co., New York. He was formerly affiliated with the American Machine & Foundry Co., New York.

A. N. TOWNSEND, chairman of the board of the Raybestos Co., Bridgeport, Conn., has been elected a director of the Reynolds Spring Co., Jackson, Michigan.

EDWARD P. WARNER, formerly assistant secretary of the Navy for aeronautics, and editor of *Aviation*, was elected president of the S.A.E. at the recent meeting.

# Business Items

The Worthington Machinery Corporation of California, Ltd., with headquarters in Los Angeles and San Francisco, will represent the interests of the Worthington Pump & Machinery Corporation, 2 Park Ave., New York City, in the California territory. H. D. Cornell, former president of the Worthington Machinery Corporation of Oklahoma, will be president of the corporation.

An additional 24,000 sq.ft. will be added to the plant of the American Bolt Co., Inc., 3830 10th Ave., N., Birmingham, Ala., now under construction, giving a total of 64,000 sq. ft. to the new building. The company is a subsidiary of the Lake Erie Bolt & Nut Co., Cleveland, Ohio, the interests of which were recently acquired by Lamson & Sessions Company.

The Pacific Coast Drop Forge Corporation, Alameda St. near Randolph St., Los Angeles, Calif., has been formed and is building a $200,000 factory, which will employ 25 men when completed. Officers include: J. C. Ballagh, president; Clarence White, secretary-treasurer; and Clarence Harris, vice-president and general manager.

The Carboloy Co., Inc., New York City, has opened a branch office in the Chimes Bldg., Syracuse, N. Y., to serve the northern central and western portions of New York State. C. W. Davis is in charge of the office.

The Eccles & Davies Machinery Co., Inc., 316-322 South San Pedro St., Los Angeles, Calif., has been appointed sole California distributor for Krupp Widia metal.

The Hutto Engineering Co., Detroit, has appointed F. D. REESE factory sales representative for industrial production equipment for the states of Ohio and Indiana.

The Fafnir Bearing Co., New Britain, Conn., has appointed Hoge Piston & Ring, Inc., Seattle, Wash., as Fafnir distributor is the Seattle district.

The Linde Air Products Co., will occupy booths 612 and 613 at the Heating & Ventilating Exposition at the Commercial Museum, Philadelphia, Jan. 27-31. H. H. Griffith of the New York office will be in charge.

# Obituaries

ARCHER A. LANDON, 61, former vice-president of the American Radiator Co., Buffalo, died in that city on Jan. 5. He was a labor advisor to President Wilson and a dollar-a-year man on the aircraft board during the war. In 1926, he organized the Landon Radiator Co., Tonawanda, N. Y., of which he became president.

SAMUEL T. WHITE, 61, for many years a national figure in the washing-machine industry, founder of the now defunct White Lily Washing Machine Co., Davenport, Iowa, died on Dec. 19 in his home in that city. He had been in failing health for some years.

JEAN F. WEBB, 82, who claimed to be the inventor of an early type of railroad block signal and who was president of the International Railroad Signal Co., New York City, for 25 years, died on Jan. 5 at his home in White Plains, New York.

ALBERT J. WEATHERHEAD, 70, president of the Cleveland (Ohio) Faucet Co., died on Jan. 5 in that city. He had been identified with manufacturing activity there for the last 50 years.

THOMAS A. STEVENS, 82, president and general manager of the Empire Brass & Manufacturing Co., Cleveland, Ohio, died in London, Ont., on Jan. 6.

LOUIS BRENNAN, 51, president of the Vistor Brass Manufacturing Co., Cleveland, Ohio, died on Jan. 2 after a brief illness.

HARRY L. MONROE, 60, vice-president of the General Electric Co., died on Jan. 7 at Dallas, Texas. Mr. Monroe lived in Chicago.

# Forthcoming Meetings

AMERICAN ENGINEERING COUNCIL—Annual Meeting, Washington, D. C., Jan. 9 to 11. L. W. Wallace, 26 Jackson Place, Washington, is secretary.

SOCIETY OF AUTOMOTIVE ENGINEERS—Annual meeting, Jan. 20 to 24, 1930, Book-Cadillac Hotel, Detroit, Mich. National headquarters are at 29 West 39th St., New York City.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Winter Convention, Jan. 27-31, headquarters at Engineering Societies Bldg., 29 W. 39th St., New York City.

STEEL FOUNDERS' SOCIETY OF AMERICA—January meeting, Hotel Sherman, Chicago, Jan. 28. G. P. Rogers, 932 Graybar Bldg., New York City, is managing director.

AMERICAN MANAGEMENT ASSOCIATION—Personnel Administration Conference, Hotel Statler, Cleveland, Ohio, Jan. 29-31. Headquarters of the Association are at 20 Vesey St., New York City.